The Builder.

No. CCCXXXII.

SATURDAY, JUNE 16, 1849.

LAST week we endeavoured to make known to our readers the nature and character of some of the more recently published collections of Gothic Architectural Exemplars. In our present number we would in like manner bring before them two or three new books connected with the art of painting, to which we have not yet had an opportunity to refer, namely, Mrs. Merrifield's translation and notices of ancient "Original Treatises on the Arts of Painting," published by Murray; "The Picture Collector's Manual," by Jas. R. Hobbes, published by Boone; and Mr. Henry Twining's "Philosophy of Painting," published by Longman.

Hazlitt scoffs at the "ambiguous quackery of rules" for the production of beauty; they have been called the "fetters of genius," and many inquirers who do not repudiate them altogether, are undetermined as to what extent they may be made available. There can be no reasonable doubt, however, as to the utility, and indeed necessity, of guiding principles. Rules are no substitute for genius, but without them genius may waste itself or be perverted; and as to their being fetters, says Reynolds, "They are fetters only to men of no genius, as that armour, which upon the strong is an ornament and defence, upon the weak and misshapen becomes a load, and cripples the body which it was made to protect."

We are glad, therefore, to find the theory of art occupying the attention of competent minds, and augur from it much advantage. "Theory," remarks Mr. Twining, "would indeed be worse than useless in the art of painting, were it to claim, as its special office, to rule the inspired thought, and to assert principles of grace in the lively creations of the fancy. Its advantages are chiefly shown in correcting the errors, and in chastening the productions, of those who want the penetration and experience necessary to proceed unguided. A more extended knowledge of the principles on which art is founded, might not add many to the best of the yearly productions of our artists, although it might diminish immensely the number of the inferior ones; and by thus rendering the attainment of that which is at least genuine and good, more easy and certain, it doubtless confers a benefit on art in general, which ascends less obstructed, and, it may be, to a loftier position, when seated on the foundation of truth, than when based on inconsistency, chance, or extravagance."

Mrs. Merrifield's work relates to the *technical* part of painting, and is a most satisfactory testimony to the learning, accomplishments, and ability of the author.* Mrs. Merrifield was deputed in 1845 to proceed to the north of Italy for the purpose of collecting MSS. relative to painting, with the view, principally, of ascertaining the processes and methods of oil-painting adopted by the Italians. On Mrs. M.'s return, Sir Robert Peel entrusted to her the publication of the MSS., with an intimation that part of the expenses would be defrayed by Government; and this book is the result. As a matter of course, much of the information given in these MSS. is practically useless, although in an antiquarian and historical point of view the whole are valuable.

Prefixed, Mrs. Merrifield has given an interesting sketch of the history and technical processes of the different kinds of painting and other arts which are alluded to in the manuscripts.

The MSS. given are those of Jehan le Begue (fifteenth century); Petrus St. Audemar (thirteenth and fourteenth centuries); Eraclius, Archerius (fourteenth century); the Bolognese MS. (fifteenth century); the Paduan MS. (beginning of seventeenth century); the Brussels MS., written by P. Lebrun, 1635, and some others.

Mrs. Merrifield has executed the task confided to her very satisfactorily, and fully justified Sir Robert Peel's selection.

"The Picture Collector's Manual,"* besides being a dictionary of painters, supplies an omission which has long been felt, namely, an alphabetical list of the various pupils, imitators, and copyists, arranged under the heads of the different masters. There is also a classification of subjects, showing the names of those who painted in the several departments of art, thus affording, as the author says, "in all uncertain cases, a clue by which the judgment may be guided, the opinion strengthened, and the doubt [sometimes] removed." A want of care in the collation of dates is observable, and is to be regretted. Thus the death of Lucas de Cranach, who was born 1472, is put in the year 1586, but in truth took place in 1553; and Cuyp appears to have been born in 1768, and to have died in 1649!

In plan, however, the work is excellent, and, in spite of what we have said, we do not hesitate to recommend it for purchase.

The author concludes his introduction, which consists of a brief description of the various schools, with the following outline of the characteristics of a few of the principal masters:—

"Titian's lights are generally in the centre; his shadows are broad and extended; his middle tints in the extremities of his figures, such as the hands, feet, &c., are of a reddish brown; those parts most distant from the light, are weakened in colour, and have a dusky appearance; his receding figures, and those on the outside of his groups, are always the most obscure; his dead colours are made with cold middle tints, and finished by laying on warm colours, extremely thin, light, and transparent; his middle tints of shadows are thinly covered with yellow, and in the darker parts with red and black; he used but little white in his lights, and none at all in obscured parts of his pictures: whilst Raffaelle used it largely, he is neither so bright in his lights, nor dark in his shadows as other masters; and in the old men of Rubens and Titian the principle appears to be the same, little or no white in the carnation, and a sort of orange colour, made up with yellows and reds; in historical compositions, his great light is in his skies and behind his figures,—he does not affect a whiteness and glitter when the light is thrown upon the fleshy part in his female figures: it shines but is subdued, and not opposed to dark shadow in obscure parts. Conceive a scale of colouring between the chalky hard manner, and the opposite extreme of obscurity, the strongest light being at No. 1; we then arrive at this comparison: Guido's strongest light on the flesh is at No. 1, his middle at No. 3, and his dark at the extreme; Titian's strongest light is at No. 2, his middle at 3, and his dark at the flesh; Agostino Carracci's are at 3, and his middle at 1; and Vandyck's are almost as strong as those of Guido, but his strongest shadows are off the flesh, and in the draperies and backgrounds."

"The Philosophy of Painting"* is a continuation of a work by the same author, Mr. Twining, entitled "Elements of the Picturesque," printed originally for private distribution only, and which was reviewed in our columns some time ago. The present volume is divided into three parts. The first is appropriated to remarks on the elementary principles which constitute the Beautiful, and those conducive to the perception of the Beautiful, and includes an analysis of the views entertained by various authors on the same subject. The second part comprises the consideration of subjects connected with imitation in painting, such as composition, expression, light and shade, styles, &c.; and the third part treats of linear perspective, projected shadows, and the perspective of reflections.

This work is the result of personal observation and thought, rather than of reference to the writings of others, and requires, for its due mastery, the corresponding exercise of thought by the reader. Those who will give this will find it eminently suggestive, and will not fail to derive from it much advantage. Mr. Twining is an enthusiastic lover of art, and for his disinterested efforts to advance the knowledge of it, is entitled to our praise,—he has his return, however, in the enjoyment the pursuit affords.

To all our readers we say, as we have often said before, cultivate a knowledge of art,—improve your taste,—and as one of the best means of doing this, lose no opportunity of exercising the eye by examining fine specimens of art. As Leigh Hunt remarks, in his pleasant "Book for a Corner," "We have reason to regard the having been conversant with a house full of paintings during childhood, as one of the blessings of our existence. We have never since entered a room of that sort without a tendency to hush and move softly, as if in the presence of things above the ordinary course of nature, of spirits left behind them by great men, looking at us with divine eyes, or informing the most beautiful visions of nature with art as wonderful."

ON THE BUILDING MATERIALS EMPLOYED IN PARIS AND IN THE VALLEY OF THE LOWER SEINE.

At the present day, when the attention of the profession has been so powerfully directed to what may be called the physiology of the materials employed in the execution of the works committed to their charge, it may be interesting to examine the practice of the architects in the neighbouring capital. Such an examination, moreover, becomes more interesting from the comparatively superior attention paid by the French architects and engineers to the study of the philosophy of the mechanical parts of their pursuits. With the glorious exceptions of Rennie, Tredgold, Barlow, and Hodgkinson, nearly all that we know of the chemical and mechanical nature of the materials we have to employ is derived from the works of the French authors. The practical lessons they have drawn from their researches become, therefore, of much more immediate importance; and, although the geological nature of the country in which they are applied differs so entirely from that of our

* "Original Treatises, dating from the Twelfth to the Eighteenth Centuries, on the Arts of Painting in Oil, Miniature, Mosaic, and on Glass; of Gilding, Dyeing, and the preparation of Colours and artificial Gems; preceded by a general Introduction, with Translations, Prefaces, and Notes." By Mrs. Merrifield. In two volumes. London, John Murray, 1849.

* "The Picture Collector's Manual, adapted to the Professional Man and the Amateur; being a Dictionary of Painters, containing 1,500 more names than in any other Work." By J. R. Hobbes. 2 vols. London, 1849. T. and W. Boone.

* "On the Philosophy of Painting: a Theoretical and Practical Treatise; comprising Æsthetics in reference to Art, the application of Rules to Painting, and general Considerations on Perspective." By Henry Twining, Esq. London: Longman and Co. 1849.

own, yet the mode of analysis adopted, and the conclusions arrived at, are as applicable here as elsewhere.

Building materials may be separated, for the purposes of classification, into the following groups:—1st, stone; 2nd, bricks; 3rd, limes; 4th, woods; 5th, metals. Under the head of bricks are included tiles, pottery, and artificial stones; under that of limes are included plaster, cement, sand, stuccos, &c. These materials are to be examined, firstly, as to the nature and qualities of their constituent parts; secondly, as to the manner of their use.

1st. Stones.—The stones employed in building are grouped thus—1st, the argillaceous; 2nd, the calcareous; 3rd, the gypseous; 4th, the silicious; 5th, the volcanic and divers natures.

The Argillaceous Stones.—These are comprised of a base of alumina, generally combined with silicates and the oxides and sulphurets of iron. They do not effervesce with the acids, and are composed of successive layers, easily separated. The schists and slates are of this class.

The slates used in Paris are extracted at Angers, in the department of the Maine and Loire. The quarries are opened in a bed of silurian argillaceous schist of an enormous thickness, which outcrops for a length of ten miles, between Avrillé and Treluzé, passing under the town of Angers, where the Mayenne cuts the direction of the formation at right angles. There are eight quarries opened in a direction from east to west. Immediately under the vegetable soil is found a bed of incoherent schist, named in the country "cosse." This is followed by a bed difficult to cleave, and, therefore used locally as a rubble building stone; and lastly occurs, about 14 or 15 feet from the surface, the useful slate. It is worked in patches about 400 feet wide, leaving underneath an unknown thickness, though the depth quarried in many cases extends to 300 feet.

The quarries of Angers furnish a slate of a very fine grain, remarkably thin and light; although the specific gravity of the slate itself is very great. It is 3·000, water being 1·000, or 188 lbs. per foot cube. Four sizes are worked for the Paris market, viz.: the "grande carrée forte," 11½ long by 8¼ wide, and ⅛ thick ($0^m.298 \times 0^m.217 \times 0^m.003$); 2nd, the "grande carrée fine," of the same dimensions as to length and breadth, but of about half the thickness; 3rd, the "cartelettes," 8¼ long by 6¼ wide by ⅛ thick ($0^m.217 \times 0^m.162 \times 0^m.003$); and 4th, the "cartelette fine," of about half the thickness. According to the statistical returns of the Ingénieurs des Mines, the value of the slates extracted at Angers in the year 1845, was at the pit's mouth 1,420,056 f. (56,400*l.*); and there were employed in the quarries 2,366 workmen.

The quarries of Charleville, in the department of the Ardennes, are worked upon a larger scale for the supply of slates for the east of France, Holland, and the Low Countries; but the expensive land carriage prevents their being employed in the capital. The value of their produce is about 1,793,945f. (72,000*l.*); they employ 2,843 men. The slates are somewhat softer than those of Angers, consequently they decayed rapidly in the damp countries where they were usually employed. M. Vialet, Ingénieur des Ponts et Chaussées, overcame this objection by roasting the slates until they assumed a red tinge; their durability was doubled by this process. In the neighbourhood of St. Lô, in the department of Calvados, are some slate quarries in the Cambrian strata, which are used to a considerable extent in the neighbourhood, and which, if the land carriage were not so ruinous, would doubtlessly be formidable rivals to those of Angers. The cathedral of Bayeux is covered with the former; but even there, the price of the Angers slate is so much inferior to that of St. Lô, as to ensure the preference for general use, in spite of the superiority of the latter. The value of the slates extracted in the department of the Calvados in 1845 was 10,360f. (414*l.*)

The usual practice in Paris and in the departments of the Lower Seine, is to nail the slates with two nails upon battens half an inch thick, and from 4½ inches to 7 inches wide, that is to say, either of deals cut in two, or of battens. Some times these "voliges," as they are called, are of poplar or sycamore, but they decay very rapidly. The slates lap over one another two-thirds of their length, leaving a "pureau" of one-third, when the inclination of the roof is not above 33°: at 45° the pureau is one-half of the slate; at 60° two-thirds. The battens are rarely laid close, for the slates are found to decay more rapidly if there be no circulation of air. The usual space between the battens is about 1½ inch. Hips, ridges, valleys, and gutters are executed as in England, with the trifling exception, that step-metal flashings are unknown; the slates are made good to the Pignon walls by merely covering the meeting angle with plaster.

The Calcareous Stones.—The formations which furnish the building stones of this class occur in the neighbourhood of Paris, and of the basin of the Lower Seine, in vast deposits. The ease with which they are extracted, and the proximity of the quarries to the places in which the stone is to be used, render their employ almost imperative; and it is to the use of these materials, that the monumental character of Paris is in a great measure to be attributed.

The nature of this class of stone is too generally known to render it worth while to dwell upon it at present. Our geological observations will therefore be merely confined to an enumeration of the great sources of supply. These are, for Paris itself, the vast tertiary formation, which nearly covers the whole of the departments of the Seine, Seine and Oise, Seine and Marne, l'Oise, and extends into those immediately around. Rouen, and some of the small towns above and below it, use large quantities of an indurated chalk met with on the banks of the Seine, whilst Havre and the intermediate towns derive their building stones principally from the oolitic formations of the department of Calvados.

Nearly the whole of the department of the Seine in which Paris is situated, may be considered as capable of furnishing calcareous stones for building purposes. The excavations which have been, and still continue to be, made, in and around Paris, are immense. About one-sixth of the town is built over the abandoned quarries, which are known under the name of the catacombs. The quarters St. Marcel, St. Jacques, St. Germain, and Chaillot, are in this condition; and it is calculated that the mass of materials extracted thence-from is not less than 385 million cubic feet. At present the bulk of the superior stones furnished by the department, comes from the quarries of Arceuil, Bagneux, Montrouge, and St. Cloud, which lie to the south-west of Paris.

The department of the Seine and Oise, is rich in quarries. Amongst them may be cited those of Saillancourt and Conflans, near Pontois, of Poissy, St. Nom, St. Maure, l'Ile Adam, and Chèrence, near Mantes and upon the borders of the chalk. The department of the Oise furnishes the lias of Senlis, and the Vergelée of St. Leu. The Seine and Marne furnish the very beautiful stone called the Chateau Laudon.

This stone of the Chateau Laudon is the hardest, densest, and, consequently, heaviest, employed in Paris. It is nearly a pure carbonate of lime, containing in 1,000 parts 18 only of magnesia, and eighteen of silicate of alumina. Its colour is a grey, slightly tinged with yellow; it is subcrystalline, resists the action of the atmosphere, and bears a kind of polish. The quarries from which it is extracted are about 63 miles from Paris; yet the great superiority of the stone causes it to be preferred wherever great solidity is desired. It was first employed in the erection of the bridge of Nemours; subsequently Rondelet used it for the paving of the Pantheon. The Barrière de l'Etoile is faced with it; the pedestals of the Pont d'Iéna, the large basins of the Chateau d'Eau, and of the fountain of the Innocents, and the parapets of the terre-plein of the Pont Neuf are executed of this stone, as are also the steps, parapet walls, and balustrades of the church of St. Vincent de Paul.

The specific gravity is 2·605; its weight about 163 lbs. Eng. to a foot cube; and it is able to resist a crushing weight of 332 kilo. per centimètre square.

The lias, which was formerly extracted to the south of Paris, was an excessively hard stone, but the quarries are nearly exhausted. The name is still retained amongst the quarrymen, and is by them applied indiscriminately to the hardest beds of the *calcaire grossière*, which rarely occur in any great depth. At Arceuil, Bagneux, Montrouge, &c., the lias is fine grained and compact, but is rarely raised in blocks of more than a foot thick. At Montereau it is occasionally 2 feet thick. At St. Cloud, it is soft; at Maisons, in the south-west of Paris, it takes a rose tint, and occurs in beds of from 9 to 10 inches thick. The specific gravity of the lias is, on the average, 2·439; the foot cube weighs 152 lbs.; the crushing weight per centimètre square is even greater than that of the Chateau Laudon; it is 445 kilog. It was doubtlessly for this reason that it was chosen for the execution of the columns of the exterior of the Madeleine and of the Bourse. The crown moulding of the large pediment of the Louvre is executed in lias, extracted at Mendon; it is of two pieces each 16 m. 24 c. long, by 2 m. 60 c. wide, by 46 c. high (53 feet 3 inches × 8 feet 6 inches × 1 foot 5 inches).

The "cliquart" extracted at Vangirard and Mendon is a species of lias of a rather looser texture.

The stones called the "roches" are hard, of a coarse grain, very shelly. They occur in beds varying in thickness from 1 foot 4 inches to 2 feet 2 inches; their specific gravity is between 2·415 and 2·305, the heaviest being, as usual, the best. The foot cube weighs between 151 lbs. and 141 lbs.; the crushing weights 302 kilogs. and 283 k. p. c. square. The roche of St. Cloud is red and shelly, but of a very superior quality; it occurs in beds from 18 inches to 2 feet thick, and has the peculiar quality of being able to be employed on the wrong way of the bed. The isolated columns of the court of the Louvre and of the garden front of the Tuileries are of this stone, and have stood well for upwards of two hundred years. We shall have occasion to revert to this apparent anomaly on some future occasion. The basements of the Madeleine, St. Vincent de Paul, Notre Dame de Lorette, of the Palais du Quai d'Orçay, and of the Bourse, are executed in the "roche de Bagneux."

The bridges of Neuilly, the Pont d'Iéna, of Louis the 16th, and numerous similar constructions, are built of the "roche" of Saillancourt. At Rouen large quantities of the roche of Chèrence are employed in works which require solidity: for instance, the stone bridge and the basement of the Custom House. The rubble filling of the bridge is, however, of the Vetheuil stone, one of the lowest members of the tertiary formations. At Havre, the plinth of the Museum is executed in the Chèrence stone. The practice of the French architects is never to employ the softer materials, such as the Caen oolite, near the ground.

The "pierre franche" is a fine, close-grained stone, less dense and hard than the "roche," but preferable for the decorative purposes of architecture, on account of the superior homogenity of its grain. Its specific gravity is about 2·130; the foot cube weighs 133 lbs. nearly; the crushing weight is about 126 kilogs. per centimètre. The lower parts of the Pantheon are of this stone, extracted at Arceuil. The angle stones of the façade of the same building are executed in blocks from the banc royal of Conflans, of the same nature; they were 10 feet square by about 6 feet 6 inches high, and weighed about 24 tons. The arches of the portico and of the interior of the church and the dome, the entablature, and the capitals of the exterior order, are of the same stone. The Vergelée and the St. Leu are of the same category, as is also the stone of l'Ile Adam; they are extensively used in Rouen and the neighbouring cities, on the banks of the Seine and the Oise, in those of the canal, and on the Northern Railway. The exterior dome of the Pantheon is in Vergelée stone.

The lambourde is a soft stone of an even, coarse grain; it decomposes when exposed to moisture, and is therefore only used in positions in which the action of the atmosphere is the slightest. The best stone of this description is extracted at St. Maur, where it reaches 1 foot 8 inches in thickness. Some beautiful stones for internal works are obtained in this series at Conflans and at St. Leu, which attain 2 feet 2 inches thickness. The specific gravity varies between 1·897 and 1·709; the weight per foot cube is between 113 lbs. and 107 lbs.

the crushing weight is about 59 kilogs. per cent. square.*

At Vernon, in the department de l'Eure, a species of indurated chalk is largely quarried for local uses. The church of Vernon, and that of Louviers, are executed in this kind of stone, as are also those of Pont de l'Arche, and of les Andelys. When fresh from the quarry these stones are soft, but they harden by exposure to the atmosphere; so much so as to resist atmospheric action in a very extraordinary manner. In the instances of the three first-named churches, all the external ornamentation is of the most elaborate character of the "flamboyante" architecture; and in all cases where the water does not lodge, the details of the foliage, and the arrises of the mouldings, are preserved in a very remarkable manner. The blocks are sometimes 3 feet 4 in. high; their specific gravity is 2·155; the foot cube weighs 135 lbs. nearly, the crushing weight is about 220 kilogs. per centimètre square.†

A similar description of indurated chalk is extracted at Caumont, in the Seine Inférieure, to the north-west of Rouen. This, or a like stone from St. Etienne, nearer still to the town, was much employed in the middle ages in the buildings of Rouen. The cathedral, St. Ouen, St. Maclou, the Archbishop's palace, may be cited as instances.

The lateral elevations of the Madeleine are of the Pierre Franche of l'Ile Adam, the upper parts of St. Vincent de Paul, of N. D. de Lorette, of Vergelée de St. Leu; those of the Palais du Quai d'Orçay, are a mixture of the pierres franches of Carrières St. Denis, Montesson, and Carrières sous bois, near St. Germain. The façades of the Bourse are in stone of l'Ile Adam and of Conflans. The restoration of the Palais de Justice, the completion of St. Ouen, the upper parts of the Douane and of Entrepôt des Sels, at Rouen, are in Vergelée de St. Leu.

At Havre, and generally in the embouchure of the Seine, the calcareous stones of the Calvados are used. An examination of them would lead us into too many details at present; but they have become so interesting to us, from the extensive use made of them in England, that it is much to be desired that a more elaborate examination be made than we have at present. The notices contained in THE BUILDER, notwithstanding their undoubted merit, present questionable points. The chemical analysis, firstly, I am convinced, is not correct; inasmuch as the Caen stone is stated only to contain *a trace* of magnesia, whilst it is notorious that the lime it yields is thin, without being hydraulic, which would not occur unless there were present a very considerable quantity of magnesia.‡ The use of the franc banc is justly objected to, but the use of the stone from the quarries of la Maladrèrie is much more dangerous, and this, I observe, is sent over to London in very large quantities. It is, if not asserted, at least given to be understood, that no inconvenience would arise from the use of Caen stone placed the wrong way of the bed; whereas all the most accurate and scientific observers who have made any researches into the subject—namely, Rondelet, Soufflot, Peyronnet, Ganthey, Sganzin, Reibel, and Vicat,—all agree in asserting that the resistance of stones is much greater when they are employed upon their natural bed. As to the action of the sea water upon the Caen stone, it is universally received amongst the French practical masons that the sea water destroys it very rapidly; and chemistry teaches us that the muriates and sulphates of magnesia, present in the sea water, enter into energetic combination with the salts contained in the limestones, and produce rapid disintegration.*

Practically, at Paris, where from the nature of the subsoil it is expensive to form cellars, and where the bulk of the houses are built upon the ground, without deep foundations, where the land is all freehold, building leases are unknown, and consequently where the interest of the proprietors is evidently to obtain the greatest number of dwellings upon the least possible surface, and the houses, therefore, are generally from six to seven stories high, the lower parts of the houses are built of the roche stone, towards the street and up to the first floor; from thence two stories are carried up in la pierre franche; and the remainder is executed in lambourde. The party walls are mostly executed of moellon, or small coursed stones, of similar natures to the corresponding parts of the façade. The back walls and partitions are of wood, filled in with light rubble, and plastered. Such construction is about as bad as can be: the front wall, built of carefully-squared ashlar, sinks very little. The party walls, of rubble and plaster, not only sink more than the front, but, from the fact that the plaster in setting expands, it becomes necessary to build these walls totally independent of one another. The back walls, of wood framework, shrink still more. It is therefore almost impossible, in the new quarters of Paris, where this style prevails, to find a house which is not disfigured in all directions with cracks and settlements of every kind and size imaginable.

The mode of using the stone is, however, logical, and merits imitation. The harder and less hygrometric stones are placed at the bottom, as being the most fit to resist the crushing weight and the capillary action of the stone upon the humidity of the soil. The finer grained stones are employed at the heights destined usually to be ornamented; the lighter and more perishable stones are used above, where they load the foundations less than the others would do, and where they meet with the atmospheric conditions the most adapted to their own preservation.

In Rouen, the Chèrence stone, or that of Vernon, are used in the situations where the roche is used at Paris; the upper parts are of the softer stones. At Havre the same rule is observed: the Chèrence, Caumont, Ranville, or granite, are used in all cases where there is danger to be feared from humidity; the Caen stone is only used in the upper works. Wherever I have seen the Aubigny stone used, it has decayed rapidly. Indeed, the French architects do not much advocate its use externally.

3rd. *The Gypseous Stones.*—These stones, from their soft and friable nature, and the facility with which they decompose in the atmosphere, are not allowed to be used as building materials in Paris. Sometimes enclosure walls are built of them, employed as moellon. The principal use is in the fabrication of plaster.

The chemical nature of these stones as found at Montmartre, Belleville, Charonne, Menilmontant, le Calvaire, Triel, and Meulan, is, according to Fourcroy, 32 parts oxide of calcium, 46 parts of sulphuric acid, and 22 parts of water. They differ from the gypsums of other countries in the large quantities of lime they contain, which gives them greater powers of resistance to the action of the moisture of the atmosphere. The operation of burning consists simply in driving off the water of crystallization. In this state the plaster has a remarkable avidity for water, and immediately that any is presented it absorbs it, and crystallizes around the bodies in its immediate vicinity. I noticed previously the singular fact of the swelling of the plaster during this process; it is one that requires great attention in the employ of the material. Another fact worthy of notice is cited by Rondelet, namely, that two bricks set together with plaster adhere with one-third more energy than bricks set with lime during the first month; but that afterwards their adhesion diminishes, whereas that of the bricks and mortar increases almost indefinitely.*

4th and 5th. *The Silicious Stones, &c.*—They comprehend the grès, flint nodules, the meulières, the granites, porphyries, and the basalts.

The grès is a species of imperfect sandstone formation, at least as it occurs near Paris, and in the department of the Lower Seine. It is composed of a fine sand of a whitish tinge, cemented together by a silicious cement. Generally speaking it occurs in detached nodules, named "rognons;" sometimes it occurs in layers of different thicknesses. The quarrymen observe that the lower they descend the softer the grès becomes, and that the harder nature of stone is the most easy to quarry in regular forms. It has no definite planes of stratification or crystallization, and is therefore easily worked into any shape required. The streets of nearly all the towns between Paris and the sea-board are paved with these tertiary grès, which occur in isolated patches along the whole course of the river. At Havre, of late, the red sandstone of May, near Caen, a member of the Cambrian system, has been employed instead thereof, with remarkable success. The usual size of the paving stones is 9 inches square; but some of the last works of this kind have been executed with narrower stones, about 4 inches wide.

The flint nodules are sometimes used for rough rubble masonry. They occur in chalk and in the gravels overlying the tertiary formations.

The meulière is a species of quartzose concretion, with numerous small holes. It is met with in two forms; one which occurs in masses sufficiently large to form millstones of one piece; the other in detached nodules scattered over the country. The principal quarries of the first, for the supply of the Paris market, are at Montmirail (Marne) and la Ferté sous Jouarre (Seine et Marne). The second sort are found nearer Paris, and in the department de l'Eure.

As the meulière is excessively hard, and resists all external action in the highest degree, it is much used by engineers and architects in situations where those qualities are required. The fortifications of Paris and of the detached forts are faced with it. Many of the works of the Canaux St. Martin, St. Denis, and de l'Oure, the sewers of Paris, and the abattoirs also, are faced with the meulière; for all these works it is admirably adapted. One species is, however, to be avoided,—"la caillasse;" its surfaces are so perfectly even that they offer no key to the mortar.

The granites, a description of which would here be unnecessary, are only used in Paris and the other towns in the interior as borders for the foot-paths, and occasionally as flagging. That used in Paris is mostly extracted at the island of Chaussey, and is of a nature closely resembling the best Devonshire granites. The plinths of the columns of the Law Institution in Chancery-lane† are of this granite, and may give a correct idea of its nature. The enormous cost of the granite, owing to the hand carriage, must at all times limit its use in the interior. At Havre, however, and at Honfleur, it is much used in the different docks, and the fortifications towards the river are entirely faced with it.

The porphyries are very little used, nor do they occur abundantly in any position suitable

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* The chemical type of the building stones of Paris may be regarded to be that of the stones found near Marly; they are thus composed—

Carbonate of lime	89
Magnesia	1
Silicate of ammonia	10
Total	100

Sometimes the magnesia disappears, and the quantity of clay and flint diminishes considerably: thus it is—

Carbonate of lime	0·985
Silex and clay	0·015
	1·000

Berthier.

† The most correct chemical analysis of the chalk in the department of the Lower Seine was made upon some extracted at St. Catherine. It is more fissured than at Vernon, St. Etienne, or Caumont, but may be regarded as of the same mineralogical type. It contains—

Carbonate of lime	68
Silicate of ammonia	12
Sand	6
Oxide of iron	2
Water	12
	100

‡ The name of Professor Phillips, by whom the analysis was made for us, should be a sufficient guarantee of its correctness.—ED.

* The calcareous stones when first extracted are certainly in a very different state to that in which they appear after losing the quarry damp, to use the expression of the quarrymen. I suspect that they exist in the quarry only as a subcarbonate of lime; at any rate, it is certain that they are hydro-carbonates. In either case the lime is, comparatively speaking, free to enter into new combinations. If sea water be introduced, the magnesia enters into combination with the lime, the more readily if carbonic acid be present, giving rise to the formation of a magnesian carbonate of lime. The sulphuric acid gas also enters into combination with the lime, giving rise to the formation of sulphate of lime. These combinations take place with the commencement of a confused crystallization, the mass is disintegrated, and falls to powder.

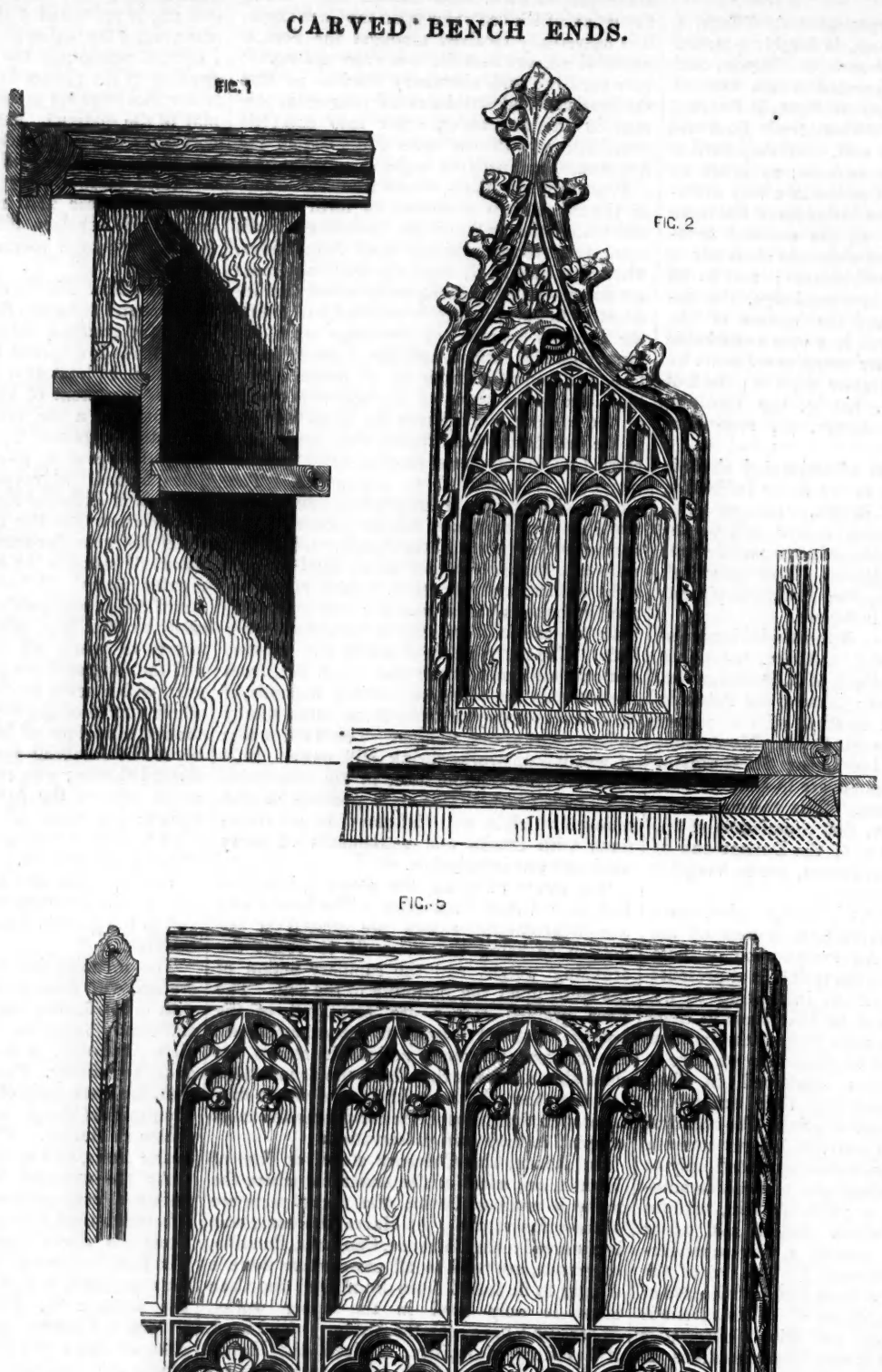
* The value of the building materials extracted in 1845 was, for the departments before cited, as follows:—

	Building Stones.	Plaster.
Seine and Marne	F.647,000	F.250,000
Seine	2,413,212	1,295,057
Seine and Oise.....	1,378,576	504,509
Seine Inférieure	109,593	
Eure	222,958	132,784
Calvados	837,551	
Oise	300,400	148,350

besides the value of the slates, quoted previously.

† That is to say, of the columns of the portico.

CARVED BENCH ENDS.



to their being worked for the Paris market. The basalts also are rare, at least for practical building use. They are, however, occasionally used for flagging, as in the Rues de la Paix, de Richelieu, &c.*

GEO. BURNELL.

CARVED BENCH ENDS.

WE add to our collection of bench ends, Figs. 1 and 2, from Atherington Church, Devon, with section showing seat and bookboard; and Fig. 3, from Plympton Church, in the same county. The form of the capping in Fig. 1 would not conduce to the comfort of the sitter.

* To be continued. The foregoing paper was read at a meeting of the Institute of Architects on the 4th instant.

ETTY'S WORKS—AN HONOUR TO THE NATION.

IN conformity with the proposition made by the Society of Arts, in 1848, to "assist in the formation of a National Gallery of British Art, by means of *public voluntary contributions*, arising from donations and annual subscriptions, and from the proceeds of an annual exhibition of the pictures and studies of some *one* eminent artist," a collection from the finished works and studies of Mr. W. Etty, R.A., has been opened in the Adelphi, wonderful for its richness in all the attributes and excellencies of art, as for the evidence it affords of the untiring perseverance exhibited by this great artist through the ups and downs of some thirty years, the manly energy that characterised his determination of succeeding, in spite of the many difficulties that beset his early career. The repeated rejection of his pictures (as we hear from himself in his own unvarnished biography*), the heart-burnings of disappointed ambition, seem only to have stimulated him to further efforts. When it is seen that such pictures as his "Judith and Holofernes," "Mercy interceding for the Vanquished," and "Benaiah," could meet with no purchasers until bought by the Scottish Academy for a comparatively trifling sum, our young artists will be encouraged against similar disheartening freaks of fortune. The possessors of such treasures may well congratulate themselves,—certainly, few could place them better.

The variety in the collection is not the least striking feature of the exhibition; one would imagine, from surmise, that it would be impossible for one man to produce so many dissimilar works, particularly taking into consideration the repetition of *materiel*; and although at first glance

* In the *Art-Journal*.

the walls present the appearance of a dazzling *melée* of flowers, fruit, jewels, and rich draperies, indiscriminately but beautifully associated, each work on inspection displays a study and arrangement of colour perfect in itself. The earlier productions are easily distinguishable from their marked care and study. What amazement will the glorious inspiration of "Judith" excite in those who behold it for the first time!—those who hardly glance at the marvellous blots with which his name has of late years been associated, will hardly recognise Etty in it, or in the still more sublime conception of "The Listening Maid," which compartment is to us the most extraordinary of the three. Who of the ancients produced a finer "Mercy interceding for the Vanquished?" wherein the most perfect drawing is combined with scarcely approachable colour. The entreaty so beautifully depicted in the female, the ponderous strength of the victor, and the horror and despair of the vanquished, are too well known to call for remark. This glorious allegory is priceless. "Benaiah, one of David's chief captains," allegorical of valour, is another foundation-stone of Etty's "high-piled" fame.

Who, past or present, depicted more in accordance with Homeric text, and yet with more original fancy, "the Syrens three," an exemplification of *the importance of resisting sensual delights?*—the voluptuous loveliness of the nymphs, whose

"Song is death, and makes destruction please,"

modelled with the grace and truth of a Phidias, and coloured in such a manner as to preclude all possibility of mistaking the author,—the positive grandeur in treatment of the infatuated Ulysses struggling with his soldiers, and the whole of the background. Who, in any case, combined so many of art's highest excellencies with so little to detract? and what further proof is requisite of Etty's greatness than that existing in this masterpiece? One is inclined almost to regret the exhibition of "Joan of Arc" placed in juxtaposition with his noblest triumphs; but considered as a consummation of his desire to paint "three times three" colossal pictures, it is a necessary and interesting appendage.

As evidencing the careful study and perfection present in his earlier compositions, (25) "The Storm," worthy of Michelangelo in feeling, and of Etty in colour (painted in 1831); "Venus and Cupid descending" (32), exquisite beyond expression (painted 1822); (42) "Pandora," another fine specimen, to which the remark that, if "pricked with a pin the flesh will bleed," applies; (44) The Parting of Hero and Leander," a miracle of moonlight painting (painted 1827); (46) "A Composition from Paradise Lost," the prototype of many a later picture by *other* hands; (102) "The Choice of Paris;" (104) "Sabrina," exquisitely chaste, and a perfect gem (exhibited 1831); (105) "Cleopatra's Arrival in Cilicia," another perfect work of art (painted in 1821); (112) "Cupid and Psyche descending," radiant with mythological loveliness; and (128) "Britomart redeeming fair Amoret," may be mentioned. They all show how unceasingly industrious and studious he was, and how he gloried in his profession. The elaborate finish, attended with so much success, determines that, to acquire the freedom so conspicuous latterly in all his contributions to art-exhibitions, a devoted attention to every minor detail, attended necessarily by hard work and perseverance in finishing to the utmost, is indispensable.

(39) "Study of a Little Girl," (61) "Portrait of Miss Wallace," and (81) "Preparing for a Fancy Dress Ball," evidence, beyond a doubt, his admiration of the style of Sir Thomas Lawrence, his master.

(14) "Diana and Endymion;" the poetic notion of Diana assuming the crescent form is strikingly beautiful, as is the general tone consistent with a moonlight effect.

(22) "Samson betrayed by Delilah" is signalised by many incongruities, but by more excellencies.

(27) Pluto carrying off Proserpine;" the two principal figures are as fine as anything in the collection. (33) "Waters of Elle;" a beautiful bit of pathos charmingly rendered; exhibited some ten years back at the British Institution. (40) is a powerful bit of colour, "The Bridge of Sighs." (41) "The Good Samaritan;" a beautiful specimen, abounding in fine points, never excelled in colour. (45) "Phœdria and Cymochles"—a bouquet of flowers.

(50) "The Repentant Prodigal's Return to his Father." The expression of the son is exquisitely appropriate, and the painting and colour inimitable; a little bit of still life painting is particularly attractive from its truth and apparent finish.

(60) "The Sea Bather;" a finely coloured half length figure of a female, in the recollection of all, from its being but five years ago in the Royal Academy.

(62) "The Saviour;" wrongly entitled, but a beautiful work of art, remarkably slight in execution.

Every lover of art ought to pay at least one visit to this most interesting exhibition.

BITS FROM BRISTOL.

The Bristol and West of England Architectural Society held their annual meeting on the 21st ultimo, when Mr. Norton read a paper on the Bristol High Cross, of which a *fac-simile* is about to be erected in College-green. It is now at Stourhead, in a miserable state of decay, the cause of which the reader thus explained:—The material used is a very coarse-grained oolite, the ova being large and distinct, and readily absorbing moisture and frost. This, however, was remedied for many centuries by the application of polychromatic colouring, which evidently formed an effectual preservative against the weather. It presents, in its mutilated state, sufficient proof that originally not the figures only, but the entire surface of the stonework, was thus enriched: the figures have best preserved these remains of colouring. The colours used were vermillion, blue, and gold. The gilding may be traced in every part,—on the ribs of groining, &c., &c.; but the vermillion is by far the best preserved, being even now of a rich hue; the blue has faded to a pale gray. The dresses of the figures are usually painted vermillion; mantles, and such portions of dress, blue; borders, and other subsidiary ornamental parts, being relieved with gold. This surface of painting has long fallen to decay, and hangs in loose flakes. Generally one of the above-named colours may be seen in an intermediate coat or stratum.

In addition to this cause of decay (the neglect of repainting the surface), another very fertile one is discoverable in the use of iron cramps; whether these are original, or only placed on the removal, cannot easily be determined; but in many instances the iron has become oxidated and increased in size to such an extent as literally to heave and thrust the stones off their beds, and a fissure thus commenced has ended in the disruption and fall of large masses of stonework. Lead is also very generally used, both constructively, between the joints, and as flashings above the canopies, &c., and in the case of the ogee arches, circular bar iron is placed within a circular roll of lead, thus forming a kind of continuous tie or bond. The lead has affected the iron in a very extraordinary manner, and from some chemical cause has completely pulverized it; in other cases the expansion of the iron has burst asunder the lead roll and the stonework in its turn,—a practical lesson we may all profit by.

The exhibition of *The Bristol Academy for the promotion of the Fine Arts* is now open, and consists of 244 works of art. The principal feature of the exhibition is Wilkie's fine picture "Columbus explaining to the Prior of the Convent of La Rabida his plan for the discovery of a new continent." Lucy, Townsend, Herbert Smith, Joy, Branwhite, and others, exhibit pictures which have been seen in London before, and there are several nice landscapes by local artists. Amongst the latter W. West has several, which are very clever, 32, "On the Conway" (figures not so good as the landscape), and 43, "Deep Shade" (something like Cresswick); and there are some good pieces of foliage, by Tucker, 114, "In the New Forest," and 132, "Wood Scene." There is a good likeness of a good antiquary, Mr. Thomas Garrard, ("the Chamberlain") by Curnock, and a painting of the "St. George, at anchor, off Devonport," by Collingwood Smith, which has much poetical feeling, and with a little more care, would have been a fine picture. "The Normal College for Wales, to be erected at Swansea," by Fuller and Gingell (231), is Tudor in style, with an octagon tower in centre.

There is an Art-Union in connection with the exhibition.

A *new church* is being built, dedicated to *St. Jude*, which promises fairly. It is in the decorated style, and has a tower. The roof, of course, is open.

St. Mark's, Easton, recently finished, is imitation Norman, and has a tower and low flat spire (or rather high stone roof), with grotesque animals creeping down the angles. There is a semi-circular absis, and within, the building is decorated in what seemed to us a somewhat tawdry and flaunty manner. We are glad to see a desire abroad to apply colour to the interior decoration of our churches, but it is absolutely necessary, if used, that it be applied artistically and with discretion.

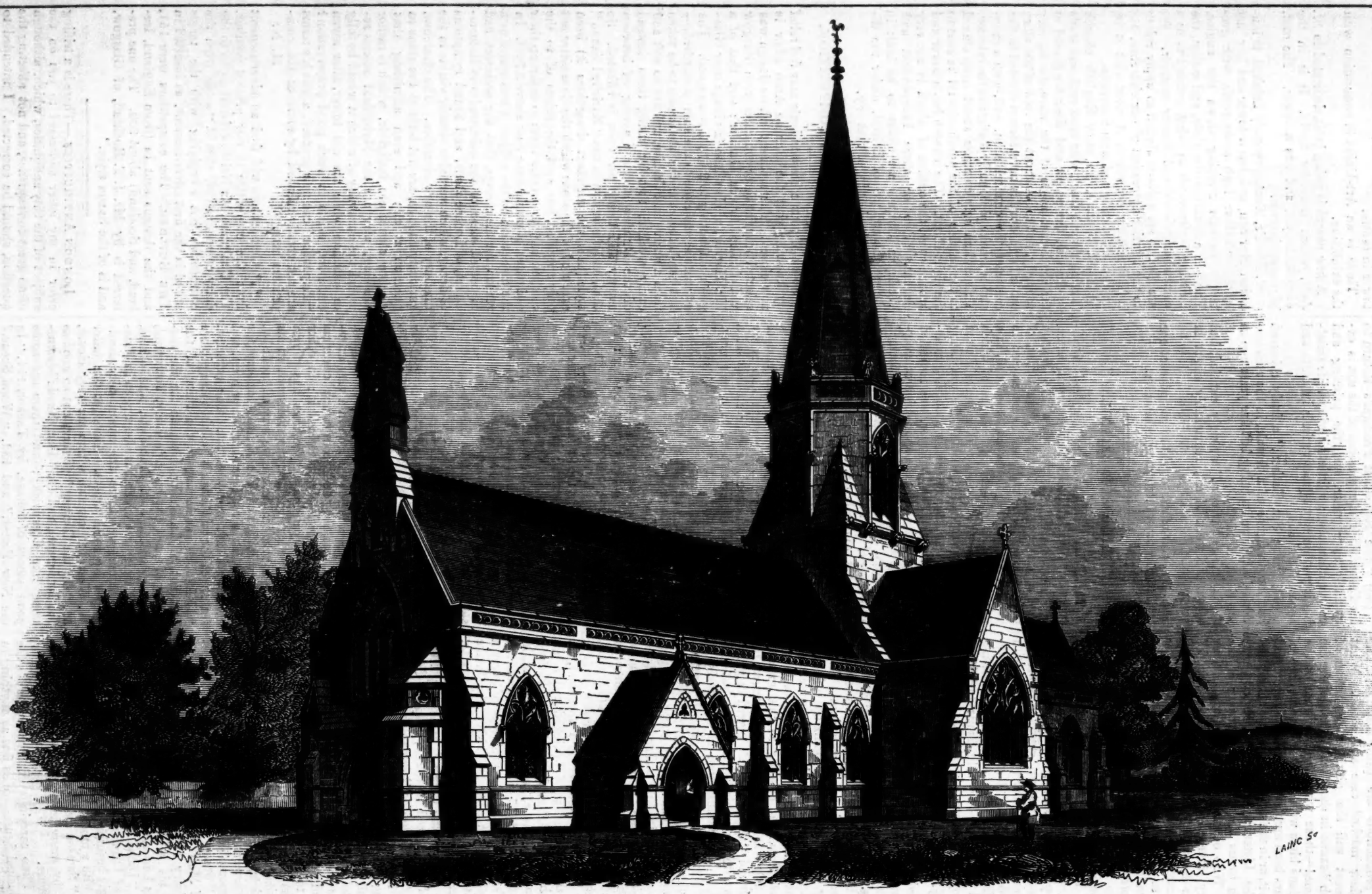
At *St. Simon's*, an early English church (having a north aisle), with open roof, and stalls in chancel, the pulpit and desk are placed at the south-east angle of the nave, so as, very properly, not to obstruct the view of the altar, but a large stove is nevertheless erected in the centre of the chancel arch, and, with a monstrous smoke pipe, sadly disfigures the interior. This and an ugly common street lamp affixed to the outside of the porch, should be sent to the right about. The church has a tower and broach spire, the outline of which is not very elegant. Two or three Independent and Wesleyan Chapels are about to be built in the neighbourhood of Bristol, under the direction of Mr. Austin, of that city.

THE DUNDEE ARCH COMPETITION.

Some of your correspondents may feel relief by knowing that the Dundee Arch affair is now closed. The architect whose design was selected brought three estimates from Glasgow and obtained two in Dundee; and that of a Mr. Harvey, of Hamilton (a village near Glasgow), amounting to 2,173*l.*, is accepted. The estimate seems close to the sum prescribed,—but here's the rub: the stones are to be taken from a quarry in Fifeshire, and are so soft and easily worked, that by using them instead of the Dundee stones a saving of between twenty and thirty per cent. is effected. So that, had the design in the "Enriched Saxon" style (thus the architect designates it) been executed of the stone which the Committee not only specified, but sent the prices of to the competitors, to enable them to make up their estimates, it would have cost above 2,700*l.* In the discussion on the subject it was stated as a reason for the change, that the architect had inspected some of the balustrades in Reform-street, of Lochee stone, and found symptoms of decay, which were also already visible in the masonry of the new churches. The churches, curiously enough, are not built of the stone in question at all; and even admitting that Lochee stones are ineligible, which is rather startling, why are the Mylnefield stones rejected, the durability of which it would be folly to question while the old tower, after seven centuries, exists in such good preservation? "Expositor" can now proceed, albeit his terms are not greatly relished by some of the competitors here. M. N.

*** Competitors will find an advertisement from the committee in our present number. The Chairman, Mr. Neish, informs us, as to the delay complained of, that it "arose from the competitors not complying with the terms stated in the first advertisement, as inserted in The Builder. The competitors were 151, and the designs sent in (from England, Ireland, and Scotland) about 300. The one preferred is by Mr. J. T. Rochead, of Glasgow, and is of the Saxon style."

London Antiquities.—There is a trifling error in my letter addressed to you on the subject of the City antiquities, which, although of no great consequence, and not affecting the question, should be corrected. I intended to say that some of the City documents, alleged to have been sold from the Guildhall, are believed to date as early as the time of Henry IV.—Amor Veritatis.



ST. MARY'S CHURCH, WEST BROMPTON, MIDDLESEX.——GEORGE GODWIN, F.R.S., ARCHITECT.

ST. MARY'S, WEST BROMPTON.

ADDITIONAL church accommodation being required for the western portion of Brompton, in Middlesex, the incumbent, the Rev. W. J. Irons, B.D., took steps to obtain it; Mr. Gunter, a wealthy and liberal proprietor, of the neighbourhood, generously presented a plot of land for the site of a new building, situated between the Fulham-road and Earles Court-road; and an energetic coadjutor being found in the Rev. Hogarth J. Swale, plans were prepared by Mr. G. Godwin, architect, and being approved of by the Lord Bishop of London and the Church Commissioners, are about to be carried out forthwith, although, as yet, the amount subscribed by the neighbourhood is small.

Our engraving represents the church as it will appear seen from the south-west, when completed. It is a cross church without aisles, with an octagon lantern at the intersection, open to the building, ornamented by kneeling angels on the parapet, and surmounted by a spire with ball flowers at the angles. In the first instance, however, it is proposed to build the nave and south porch only, with the lower part of the tower, which is to be roofed to form the temporary chancel, and a bell cot is therefore provided at the west end. The length of the nave is 86 feet, and the width 33 feet; the temporary chancel about 18 feet square. The height to the ridge is 46 feet. There is a small open gallery of wood for children at the west end (the turret seen in the view contains the stairs to it), with screen beneath; and there is accommodation in the part now to be built for about 500 worshippers.

The style of architecture adopted is the Decorated; the materials, Kentish rag with Bath stone (from the Coombe Down quarries) for the dressings. The walls are 2 feet 3 inches thick, on a concrete bottom. The roof is open, of course, having arched ribs at intervals springing from carved stone corbels: the covering of green slates. All the seats are open, and have ornamental ends.

The following tenders were sent in for the execution of the work:—

Carter and Ellis	£3,297
Glenn	3,251
Haward and Nixon	3,240
J. Barr	3,096

Considering that each builder took out his own quantities, their close approximation is somewhat remarkable.

The estimated additional cost of Caen stone for the dressings in lieu of Bath stone varied from 130*l.* to 100*l.*

The church will occupy the centre of an ornamental enclosure, which will have detached villas, in a crescent form, around it.

POPULAR EDUCATION.

YORKSHIRE MECHANICS' INSTITUTES.

AT the Hull Athenæum *soirée*, held on the 30th ult., after a meeting of the Yorkshire Union of Mechanics' Institutions,* some admirable addresses were delivered by the Earl of Carlisle, who presided, the Earl of Yarborough, the Dean of Ripon, Dr. Hodgson, Mr. E. Baines, Mr. Clay, M.P., the Rev. James Aspinall, and others.

Lord Carlisle, in the course of his speech, said, I should think that person a very injudicious friend of mechanics' institutions who should pretend that in your reading rooms and lecture rooms, the means were afforded of turning all your members at once into finished scholars, or ready-made philosophers; or should say that they put it in your power to grasp that eminence which must always be the reward of the midnight toil of the student, or the life-long research of the experimentalist. But if it be the object how to raise the toiling masses of our countrymen above the range of sordid cares and low desires—to interweave the daily drudgery of life with the countless graces of literature, and the glowing web of fancy—to clothe the lessons of duty and of prudence in the most instructive as well as the most inviting forms—to throw open to eyes, dulled and bleared with the irksome monotony of their daily task-work, the rich resources and the boundless prodigality of nature—to dignify the present with the lessons of the past and the visions of the future—to make the artizans of our crowded workshops and the inmates of our most sequestered villages alive to all that is going on in the big universe around them — and, amidst all the startling and repelling inequalities of our various conditions, to put all upon a level in the equal domain of intellect and of genius; if these objects, and they are neither slight nor trivial—if these objects are worthy of acceptance and approval, I think they can be satisfactorily attained by the means which mechanics' institutions place at our disposal, and it is upon grounds such as these that I urge you to tender to them your encouragement and support.

His lordship mentioned that the London School of Design has consented to give elementary drawing books to all mechanics' institutes which may choose to enter into the proper arrangements for obtaining them, and that drawing is taught in 27 institutes to 682 pupils.

In concluding, the speaker said,—There is hardly a country, hardly a community, which is not disastrously suffering from the evils of the revolutionary wars which are now going on. Look at the condition of Europe at this moment—the Russians on the Danube, the French on the Tiber—why, it would really seem as if the nations of Europe, in some species of wild bacchanal, were seizing the torches of civil discord and foreign war, and throwing them in furious glee from frontier to frontier, river to river, rampart to rampart,—scaring the homes of peace and the haunts of industry with uncouth dissonance and hideous glare. While such are the appalling sights and sounds of which we catch the reflection and the echoes here, let us in Yorkshire,—let us in England,—while we in our accustomed occupations move on in our allotted spheres in the broad and equal light of freedom, let it be our care to light the genial lamp of knowledge, and to transmit it from hand to hand, from institution to institution, from wold to plain, from college to college, from the workshop to the cottage, through every portion of our land, till there shall be no haunt of human revelry unrebuked, till there shall be no abode of ignorance unenlightened, till there shall be no haunt of peaceful industry uncheered.

The Dean of Ripon mentioned three individuals who had recently gone out of the Ripon Institution:—One of them, a common bricklayer, came to seek for instruction and the advantages to be derived from the school in that place. He is now a person of considerable comfort and station in Australia, and he subscribed 5*l.*, said the dean, for our new building, and states that he owes all that he has from *having* had an opportunity of entering our Mechanics' Institute. Another man came in, whose abilities became quickened, his ambition turned, and his full purpose of mind excited. He is now in most comfortable circumstances in Sweden, and writes continually with a bosom full of gratitude for the benefits he received. Another individual who came into the institution first got education himself; then he became a teacher; afterwards he put himself forward, until he was made master. He is now an engineer in a most important situation, and rising rapidly in the comforts of life. I may just add, continued the rev. gentleman, two other cases, which I think were exceeding good: they were two poor "navvies," who came to the institution, after working fourteen hours in wheeling and labouring at a railway, to learn to read, write, and to cypher. These men, at the conclusion of the railway work, came to the institution, thanked the secretary for the knowledge they had acquired, and for what was of more value to them,—the habits of sobriety, temperance, and retirement, apart from the evil ways of their companions. They were both going to America, and came to take their leave. One had saved 80*l.*, and the other 100*l.* These are the practical every-day events, which I believe are taking place in the bosoms of our institutions.

And then chimed in Mr. Baines, and said,—It is not poverty that is vulgar. Poverty may be most honourable and most highly to be respected. But it is ignorance that is vulgar,—it is vice that is vulgar. It is the habits of a low, sensual, and degrading kind, which are vulgar. These are things which, if a man carries with him from a lower station to a higher, will make him vulgar in spite of all the dignity his position may give him. Our object is very unambitious. We have to labour by most homely means, and to labour in a very elementary way upon the very humblest classes, and there it is that we do our good.

* The total number of Mechanics' Institutions, as comprised within the Yorkshire Union, amounts to 84, and the aggregate number of members thus united is 15,728. Within the period of this last year there has been an addition of five institutes and of 1,623 members to the ranks of the institution.

NORTHAMPTON CORN-EXCHANGE COMPETITION.

MANY of your readers will doubtless be glad to know how this affair is progressing. Between fifty and sixty very elaborate designs have been sent in, the mere cost of which, wholly irrespective of the labour of each individual competitor, cannot have fallen far short of a thousand pounds, or one-eighth of the actual sum required to erect the building,—so that there is, I think, a strong case for assuming, as a friend of mine did the other day, that, take them on the whole, architects are a very wealthy, public-spirited body of men. Henceforth, Sir, let us hear no more of *poor* architects, since this is the every-day style in which we respond to advertisements for competitions; and, in fact, you may say, why should we trouble you with our individual complaints of the mode in which competitions are conducted and decided, since it is evident, from our torpidity as a body, that we are extremely well satisfied with the system?

In the present case I understand the committee have selected three designs, one of which they propose to adopt. The rest may be seen, not hung up (for even simplicity's sake), but laid out flat upon tables, one drawing upon another, or, as the case may be, one design upon another; so I leave you, Sir, to judge what must have been the expertness, discernment, and not merely mental but downright manual exertion of these gentlemen, to have thoroughly examined in so short a time (for their meetings are few and far between), this vast and cumbersome stratified surface of architectural drawing.

> They'll settle the mystery *sine timore*,
> And (as we *must* all suppose) *sine favore*;
> But *both* things they'll never do, *sine sudore*.

But to be serious (and it is indeed a serious matter): How was it possible thus to do justice to the very many competitors, some of whom I know to be eminent men?

I write to THE BUILDER because this affair is still undecided; and your journal will be again published ere the next meeting of the committee can take place. I do not at all assume that these gentlemen would knowingly act unjustly in this matter; the blame, in fact, lies at our own doors; for architects, and they alone, have the power to remedy this state of things. I must add, that although the Committee have thought themselves competent to select the three best designs out of the fifty or sixty, and have ascertained the names of their respective authors, they are completely at fault as to which one of these few to choose; and they have therefore called in a F.R.S. from London to decide which is the best of all the three. Whoever this gentleman may be, his being called in at all speaks well, I think, for the good intentions of the committee; and I entertain a hope that he will explain to them that if they really desire their project to be benefited by his professional experience and ability, they will at once take his opinion, not merely of these *three* designs, which, by the by, they will not admit any competitors to inspect, but of the entire fifty or sixty submitted.

By publishing these particulars the adjudication of this competition will become more or less what that of all public architectural competitions ought to be, a public transaction, open to the face of day; and I am convinced that the more they are made so the better it will be, not for architects merely, but for our public buildings, and still more especially the interests of those most mysterious, invisible, and much-abused gentlemen, the architectural competition committees.—I am, &c.,

W. Y.

THE ROYAL ACADEMY OF FINE ARTS AT BERLIN have elected Mr. Donaldson an honorary and foreign member of that body.

LORD LOVELACE'S COLLAR ROOF.

INSTITUTION OF CIVIL ENGINEERS.

AT the meeting on Tuesday, June 12, Mr. J. Field, President, in the chair, "A description of the construction of a collar roof, with arched trusses of bent timber, at East Horseley Park," by the Earl of Lovelace, was read.

The roof, which covered a hall of 56 feet long by 24 feet wide, was described as being sustained by four arched trusses, springing from stone corbels. The ribs of these were each composed of four layers of deals, 3 inches thick, bent to the required form by steam heat. All the mouldings surrounding the tracery were also bent to the required forms in the same manner, thus giving, as was thought, great strength and lightness, as well as performing the work with greater economy of labour. The tracery was cut out from two thicknesses, half-an-inch each, of tub-stave oak, glued together, with the fibres at right angles to each other, which facilitated the carving, and gave greater strength to the minute tracery.

The ceiling was formed of half-inch diagonal boarding, and as the slate battens crossed it in a horizontal direction, the roof was strongly braced against the action of wind, and the staining of the alternate boards gave a pleasing variety of effect.

This kind of construction was first suggested by Colonel Emy, in his work on Carpentry, but he had applied it to much flatter roofs of large span, whereas Lord Lovelace's intention was to demonstrate its applicability to roofs for edifices in the Pointed and Tudor styles, and to show that great advantage would result from bending timbers rather than cutting them to the requisite forms; that the thrust of the roof might be entirely taken from the upper part of the walls, and carried far down them, and that such a construction might be adopted as would satisfy every condition of solidity, and, at the same time, admit of considerable decoration.

THE DOVER BREAKWATER.

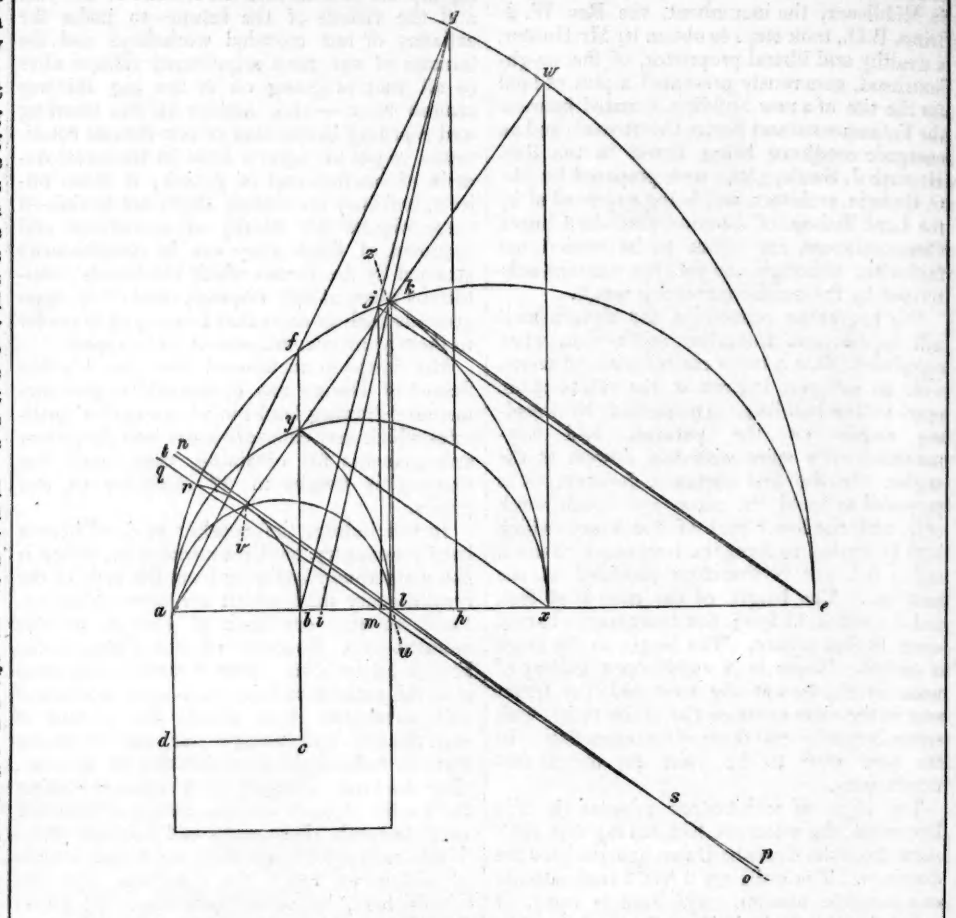
THE formation of the breakwater at Dover appears to be proceeding satisfactorily. It commences near the look-out house, and will run out into the sea, in cants about 800 feet, so as to form a harbour. A length of about 270 feet is done, and about 100 feet more will be added this season: the progress is regulated by the amount of money voted.

The outer faces of the breakwater are of Yorkshire stones (Bramleigh Fall), backed up with a course or two of Portland stone. The stones are very large, measuring above 80 feet cube in each. The space between the two walls is filled in solid with concrete. Large blocks of concrete are prepared (hard and dry), ready to use as they get out more into the sea, and two diving-bells are in daily use by the workmen. There is a steam-crane to raise the stone out of the ships, and the mills to grind lime for concrete, and brick-earth burnt for mortar, are worked by steam power. There is a large quantity of stone ready for setting.

The work appears to be well and carefully done, and is creditable to the contractors, Messrs. Lee, of Chiswell-street. Mr. Walker is the engineer.

BREAKWATERS AND LANDING PLACES.—We have lately inspected models of some inventions connected with landing-places, which seem to deserve the inspection of those whose attention is directed to such matters. They consist of a floating pier and buoys, double action yielding moorings, also an attached self-adjusting tidal ladder, constructed on a new principle, and which seems well suited for the purposes intended. The inventor has also constructed a life-boat and travelling crane, for the preservation of life from stranded vessels: this is attached to his floating pier,—which, from its construction, he considers will be enabled, at all times, and in all weathers, to maintain its position. The name of the inventor is Savage. A floating bath and breakwater, a floating light, and a plan for extinguishing fires on board ships, by the provision of a series of perforated pipes under the decks, bear further testimony to his ingenuity and skill.

MULTIPLICATION OF THE CUBE.



MULTIPLICATION OF THE CUBE.

THE attention of the writer was directed to this subject by the following passage, in the *Mechanic's Magazine*, for the 7th of last October, page 355:—"At this time Mr. Mackie, a Roman Catholic priest, published a duplication of the cube, the plausibility of which attracted attention, and, it is said, even obtained the assent of the teachers of Maynooth. Young Murphy, then eighteen years of age, answered this duplication in a pamphlet, entitled "Refutation of a pamphlet, written by the Rev. John Mackie, R.C.P., entitled 'A method of making a cube double of a cube on the principle of elementary geometry,' wherein his principles are proved erroneous, and the required solution not yet obtained." By Robert Murphy, Mallow, 1824, (20 pp.)

Let *abcd* be equal to one of the sides of the cube to be multiplied. Make the line *ae* as many times greater than the line *ab* as the required cube is to be greater than the given one; *ab* is the linear unit, *abcd* the square unit.

Upon *ae* describe the semicircle *aef*, draw *bf* at right angles to *ae*, with radius *ae* describe the arc *eg*, through the point *f* draw *ag*, draw *gh* parallel to *fb*, bisect the angle *agh* by the line *ig*, from the unit point *b* draw *bg*, from the points of intersection *j* and *k* draw *jm* and *kl* parallel to *fb*, draw *ke* and *je*, draw *no* and *pq* respectively parallel to *ke* and *je*, with *ab* for a radius describe the arc *br*, from the point of intersection *s* draw *st* tangential to the arc *br*; the square described upon *au* is equal to one of the sides of the required cube.

Demonstration. Upon *au* describe the semi-circle *auv*, cutting the tangent *uv* and the arc *rb* in their common point *v*, through *v* draw *aw*, draw *wx* at right angles to *ae*, and complete the figure.

The apex *z* of the triangle *aez* in one particular case, will coincide with the points *j* and *k*; in all other cases, it must lie between them; the angles *jek* and *qsn* (formed by corresponding parallel lines) are equal, and are similarly divided by the parallel lines *ze* and *vs* (the last by the construction at right angles to the unit radius *av*); the right-angled triangle *auv* inscribed in its semi-circle is equal to the right-angled triangle *aby*, and the hypothenuse *au* is equal to the hypothenuse *ay*; the right-angled triangle *awx* is equal to the triangle *aez* inscribed in its semi-circle, and the side *ax* is equal to the side *az*.

By similar triangles,

$av = 1 : ay = au : : au : ax = az = au^2$

$av = 1 : az = au^2 : : au : ae = au^3$

Numerals.	Cubes.
$ab = 1$	
ab^3	$= 1^3$
$ae = au^3$	$= ae \times 1^3$

The cube represented by the numeral au^3 is as many times greater than the cube denoted by ab^3 as the line *ae* is greater than the line *ab*.

$bx = ax - 1 : by :: by : ab = 1 . by = \sqrt{ax - 1}$

$ab = 1 : by = \sqrt{ax - 1} : : au = \sqrt{ax} : uz = xy = \sqrt{ax} . \sqrt{ax - 1} .$

$ay = \sqrt{ax} .$

$xy^2 + ay^2 = ax^2 - ax + ax$

Squares described upon *xy* and *ay* are together equal to the square described upon the hypothenuse *ax*. J. P. W.

*** The above is to be regarded merely as an approximation, our correspondent's demonstration being incomplete.—ED.

METROPOLITAN COMMISSION OF SEWERS.

A GENERAL court was held on Thursday, the 7th instant, at the Sewers Court, Greek-street; the Earl of Carlisle in the chair.

The Sewage Manure of the Metropolis.—A report was read from Mr. Donaldson, assistant-surveyor, on recent experiments made by him with sewage manure at Brentford, Hanwell, &c., and with very satisfactory results. The operations had been conducted by the use of the hose and jet. The average quantity supplied was 110 tons per acre; the time occupied being one hour and five minutes per acre, and the cost 1s. 8d., exclusive of its conveyance. In reference to this report, a recommendation was received from the Sewage Manure Committee that advertisements be issued, inviting offers from the owners and occupiers of land at a moderate distance from town to take the sewage, the supply to be at the rate of eighteen irrigations per annum of 250 tons each, and stating that the metropolitan districts would yield sewage matter equal to the irrigation of 150,000 acres.

Mr. Chadwick rose to move the adoption of the recommendation, and in doing so, remarked on the important results arrived at by the use of

sewage manure in Edinburgh, in Milan, and the whole of Belgium; and hoped they were now in a condition to bring those advantages nearer home, not only in converting the sewage to the use of lands near to the metropolis, but to offer it to farmers, on very low terms. The results showed, by the use of the manure they obtained double the quantity of grass, and from other results they were fully satisfied that through its use the metropolis might be amply supplied with grass-fed lamb, at least one month earlier than heretofore. In confirmation of this statement, Mr. Chadwick read an extract from a letter received from Mr. Roe, the former surveyor to this commission, which stated that by the use of liquid manure, he was last year enabled to cut five crops of grass, leaving besides a good feed, and that this year he expected to cut seven crops, worth to cowkeepers from 6*l.* to 7*l.* per acre each crop. He might mention Edinburgh as an example of the productiveness of sewage waters, and also the waters of Milan. Experiments of a most important nature had been made, not noticed in Mr. Donaldson's last report, as it was of the first consequence to surmount the difficulty of the removal of the manure, and the cost of its conveyance. By Mr. Donaldson's plan, the top dressing of an acre of land would cost but 1s. 8d., while the usual expense was 1*l.* 7s.

The Earl of Carlisle—Does that include the cost of the article?

Mr. Chadwick said that was only the cost of the delivery, but it was an established fact that they should be able to supply it at one-sixth its former amount, or to give six times the number of doses for the same charge, and the labour of an acre could be performed by a man and a boy in about forty-five minutes, and in the course of half an hour no person could distinguish in walking over the land that anything had taken place. This was an immense gain, as it did away with the question of its offensiveness, and removed the objection in a sanitary point of view to the use of this manure. With these advantages, it might be asked, why not advance the state of the land in the vicinity of the metropolis? Mr. Donaldson had stated that on all the lands irrigated he found the crops look better, except on the undrained lands, of which there was a great deal in the vicinity of London, of pestilential marshes in almost their primitive condition. The consumption of this manure would not be impeded by a distance of twenty or thirty miles, provided large quantities were used, for beyond the metropolis, in the sandy lands it might be used with advantage, and a strong manure obtained for about 2s. per acre. There had, unfortunately, been great obstacles to their proceedings in various ways, and necessarily a corresponding delay in their operations; but great works were now in progress, and with the most promising results. A committee had been formed, consisting of Sir John Burgoyne, Sir H. de la Beche, Captain Dawson, and Captain Veitch, of the Royal Engineers, who were considering the best means available of getting rid of the pollution of the Thames, and were seconded in their labours by the Sewage Manure Committee. He hoped, therefore, on the completion of the survey, they should be enabled to distribute the sewage that at present flowed into it at a distance of 20 or 30 miles from the metropolis. There were many persons who could not see what relation these measures, or agricultural land drainage, had to do with the sewerage of the urban districts; but he contended that the health of the metropolis was mainly dependent on the external operations. There were other questions under consideration, and amongst them a plan for intercepting the sewage, and conveying it to an immense reservoir at the Isle of Dogs; and as to how they could get by the docks;—all subjects of considerable importance. However, the whole question would be examined, and fully reported upon by the officers and engineers of the commission. He concluded by moving the adoption of the recommendation of the Sewage Manure Committee.

Mr. C. Johnson seconded the motion, and said that the grand object in the interception of the sewage of the metropolis was, that there was sufficient of it poured into the Thames to irrigate 1,000 acres of land daily, allowing at the rate of 250 tons per acre; which would yield a great return of revenue for any expenses incurred. They must, however, look forward to the day when they could remove this sewage to a greater distance from London than they were now justified in announcing, and this might be done without putting the public to any expense. There were large breadths of land in Sussex, on the banks of the Crouch in Essex, and in Hertfordshire, where it might be used with the most advantageous results. They proposed to carry it through open or closed pipes, according to the facilities given. At present all sewage was carried through closed pipes.

Mr. Chadwick remarked, that having taken the average drainage of 1,000 houses for sixteen hours, they found that, with an ordinary flow, *the whole of the sewage of the metropolis could be passed through a three-feet pipe.*

Mr. Slaney felt the deepest interest in the question, and had the greatest respect for the opinions of his friend Mr. Chadwick; but thought that it was extremely desirable, for sake of the success of their endeavours, that the advantages should not be placed in too broad or too favourable a point of view. He had no objection to the form proposed, and that they should receive tenders for the sewage, but that it would not be wise to go to large expenses until they were well assured of the success of their experiments. The statement that had been made by Mr. Chadwick, and supported by Mr. Johnson, would go before the public, and no doubt its merits would be well sifted and tested, and then, if satisfied with the practicability of the plan, it would be taken up by enterprising individuals, not alone in the metropolis, but in many provincial towns, whose situation for its use was much better than the lands near to London. In the high lands particularly it would be of great value. It appeared that 18,000 acres of land could be manured with 250 tons per acre, and taking this to increase its value but 10s. per acre, at 6 per cent., it would then yield an annual increase of 200,000*l.*, and therefore he believed that numerous parties would be found willing to come forward, and by themselves carry out these important results and advantages.

Lord Ebrington was as desirous as Mr. Slaney to understate, rather than otherwise, the advantages to be derived, but must altogether demur to the estimate of 10s. per acre as the increased value from this irrigation. He was cognizant of a fact that, in Devonshire, a clear stream of water merely being passed through a track of land, increased its value from 2*l.* to 3*l.* per acre; but to give but 10s. per acre as the increased value from sewage manure was quite out of the question. He would mention that the Duke of Portland had converted land worth not more than 7s. per acre into water meadows, by means of the sewage received from the town of Mansfield, which was not very strong, and its value had been increased to 14*l.* per acre. In Edinburgh, too, the value had been raised from 5s. to 25*l.* per acre. Such being the case, he believed the calculations of Mr. Johnson were not overstated in giving the increased value at 10*l.* to 12*l.* per acre. He found that water could be conveyed 5 miles at 2½d. per tun, and therefore the charge of conveying fresh water to towns need hardly differ from the cost of conveying the dirty water back. Pure water was not more necessary in towns than the fertilizing fluid was to the farmers for the purposes of vegetation.

Dr. Southwood Smith said as to the operation of the fluid in a sanitary point of view, he found that the deodorising fluid entirely destroyed the offensiveness of the manure, increasing at the same time its value to the land. He had himself tried experiments upon two acres of land, and had used a great deal of the most offensive manure, but by applying deodorisers, in half an hour not the slightest odour was perceptible. He used nitrate of lead, which was very cheap.

The motion was put and unanimously agreed to.

Amendment of the Sewers Act.—A recommendation was received from the Works' Committee, "To consider as to representing to her Majesty's Government the necessity of applying to Parliament for amended powers."

Mr. Bullar, in support of this recommendation, said the cleansing operations in one district were brought to a complete stand. By the decision of Mr. Burrell, under the provisions of the Police Act, they were prevented from cleansing cesspools in the day time, and in their endeavours to conform to this decision by cleansing them at night, they were met with a fresh difficulty, the Chelsea Water Company then refusing to supply them with water; so that they were prevented from doing the work either by night or by day.—This subject led to a short conversation, and it was agreed that the heads of a Bill be drawn up by the Bye Laws Committee, and transmitted to her Majesty's Government for presentation to Parliament.

A resolution was passed that all fossils, coins, &c., found in the excavation of works under the commission, be the property of the commission.

THE NEW BUILDINGS' BILL.—Your remark last week was loudly called for. It is exceedingly desirable that the intended Buildings' Bill should be passed through Parliament without further delay. When we know that the amendments proposed occupied a commission, supposed to be well able from their practical experience to deal with them, several months, that this commission was appointed by the noble lord at the head of the Woods and Forests, there would seem to be little cause for delay, and I cannot but think that somewhere or other there must be apathy or inattention to the wishes of those interested in the amendment of the present inadequate piece of legislation. A. B.

Miscellanea.

PROJECTED WORKS.—Advertisements have been issued for tenders, by 19th inst., for the erection of baths and washhouses in Kent-street, Birmingham; by 25th, for certain repairs, and painting, whitewashing, &c., at St. Martin's workhouse; by 3rd July, for constructing a new sluice, and other works at Outwell; by 6th July, for relaying the carriage way, &c., of High-street and Spital-square; by 30th inst., for putting up new roof on Kirton in Lindsey parish church; by 25th, for the various works to be done in erecting the York county hospital; by 25th, for the erection of a granary and dwelling-house at Huntingdon; by 23rd, for alterations and additions at Peterborough union workhouse; and by 26th, for copper, gas-fittings, &c., lead, zinc, glass, nails, screws, and other stores, for the Lancashire and Yorkshire Railway.

CHURCH DECORATIONS.—At the last meeting of the Archæological Institute, held on the 1st inst., drawings of two ancient reredos, recently discovered during some alterations in the church of St. Cuthbert, at Wells, Somerset, as mentioned by us some time since, were presented, and detailed descriptions given. One reredos was found in "Tanner's Chauntry," and presents a series of nineteen gorgeously carved and gilded and elaborately groined canopied niches, some of which contained mutilated figures, with scroll and descriptions, such as are usually represented in the history of Jesse. The other is of a still more highly enriched character, and was found in the Lady Chapel: it has two rows of niches and pedestals, five in each row. Previously to these discoveries, a fine painting of the "Salvator Mundi" had been found on the walls of the chapel of the Holy Trinity in the same church. The Marquis of Northampton in some observations on the frequent discovery of the ancient decorations of our churches, mentioned to the meeting some wall frescoes (?) which, on removing some plaster in the church at Castle Ashby, he had found decorating the splay of one of the chancel windows. These were in outline, and bore no traces of having been coloured originally. The style of art was of about the date of the fifteenth century.

SOCIAL IMPROVEMENTS.—Under this head Mr. Charles Cochrane has published a sensible address on a broad-side, drawing attention to the Acts of Parliament which afford to the public a power to remedy most of the evils relating to bad drainage, overflowing cesspools, nuisances of every kind, offensive privies, filthy streets, courts, and alleys, expensive means of bathing and washing, impure and expensive water, fetid and expensive dwellings for the poor, the overcrowding of churchyards, &c., evils which tend to retard the social progress of the human race. In conclusion, he says wisely, "local meetings will prove of service; but care must be taken that the discussions are conducted free from any angry or personal feelings. A temperate, conciliatory, course is almost sure finally to win over the most prejudiced or the most obstinate. Above all things, never allow party or political questions to be obtruded on your meetings convened for social purposes."

RAILWAY JOTTINGS.—The first tube of the Britannia-bridge is to be floated on Tuesday, 19th inst., at an early hour, unless the weather induce a postponement till next morning.——The works of the Tunbridge Wells and Hastings Railway are now in active progress from Tunbridge Wells southwards, to near Ticehurst. Gangs of men are working night and day the heavy tunnels at Wadhurst and Strawberry-hill, which give employment to upwards of 1,000. Tunnel bricklayers seem much in request, getting high wages. Eight large brick-fields are in full operation.——A correspondent of the *Gateshead Observer* describes the railway bridge at Yarm as spanning the river Tees "by two oblique arches of 66 feet span each, built entirely of stone (and not a suspension bridge, as the *Herald* says.) There are at the north side of the river arches three land arches, and at the south side thirty-eight, making altogether forty-three arches. The land arches are 39 feet span. The height from low water to the rail is about 68 feet; and the average height of the land arches, from the surface of the ground to the rail, about 55 feet."

THE HIGH LEVEL BRIDGE ON THE TYNE, at Newcastle, on the York and Berwick line of railway, will, it is expected, be opened with great ceremonial on 1st August. The key of the last arch was driven home on Thursday week, by the Mayor of Gateshead, Mr. Hawks, of Hawks, Crawshay, and Co., the contractors for the ironwork. His worship stripped for the occasion, and in a business-like manner, as became a captain of industry, with a rosewood handled brass-headed hammer, struck the last few blows that united this great work from end to end. The first pile, according to the *Gateshead Observer*, was driven on 24th April, 1846, in presence of its designer, Mr. R. Stephenson, M.P.; and the first segment of the first arch was placed so lately as 10th July last. The iron work rising to a height of 120 feet above the bed of the river, much caution was called for, and from the careful and expensive arrangements therefore made, there has been neither loss of life nor limb in the fixing of the six massive arches, many of the castings of which weighed from 10 to 12 tons each. The cost of the bridge when completed is estimated to be 243,096*l.*; the viaduct through Gateshead and Newcastle, 113,057*l.*; land, compensation, &c., 135,000*l.*; total 491,153*l.* Large as this sum is, however, it is only half the amount that rumour assigned as the cost of the bridge alone.

A TREAD-WHEELED COACH.—We have already had schemes for the complete inversion of the railway system, with wheels on the sideway and rails on the train,—so that no one need now be surprised to hear of an inversion of the old jog-trot highway system, with the horses *riding* in the coach, and the passengers hanging on by the wheel. Such is literally the fact alleged to have been recently realized in Ohio, U. S., where a single broad wooden wheel or roller, 14 feet in diameter, and 6 feet in breadth, has been fitted up with tread-boards for the horses within, and an axle whence seats are suspended for 24 passengers. Iron stays stretch from each axle upwards, and meet above in a seat for the driver, who, it would appear, can turn about and wheel about as quick as Jim Crow, or at least much quicker than a coach and six. We should prefer seeing it running straight on up-hill, however. Two heavy draught horses, it is said, can easily bowl along two dozen passengers (on a level, we presume), at the rate of one dozen miles per hour, and win easy too, their work on the tread-mill being mere amusement.

MURAL PAINTINGS AT ST. CROSS.—Coloured drawings of these paintings, recently discovered on the walls of the Church of St. Cross, were exhibited by Mr. Francis Baigent, at a recent meeting of the Archæological Association. Some are exceedingly elegant in design, and apparently of the early part of the fifteenth century. Mr. Baigent was stopt in his efforts to obtain complete sketches, as the Earl of Guildford ordered the walls to be immediately re-whitewashed, as already mentioned.

ROYAL COLLEGE OF CHEMISTRY.—It seems but yesterday since we had the plan and elevation of this new college in THE BUILDER, as a novelty not yet realized, and now we have before us a goodly volume of the "Researches conducted in the Laboratories,"* with an able 'Introduction' and 'Remarks,' by Professor Hofmann, their presiding genius. The institution is now in a flourishing state, free of debt, and already nearly independent. The lecture theatre, however, of the original design (cost 1,800*l.*) is much wanted, together with some further temporary assistance, which we hope will not be denied to so thriving and hopeful a germ of future scientific greatness. We are pleased to observe amongst the items of chemical advancement within the last year or two, enumerated in Professor Hofmann's introduction, one in the reception and establishment of which THE BUILDER may justly claim some little credit, namely—"the happy substitution of the stable and innocuous oxide of zinc, as a pigment, for white lead, which is so easily injured, and so frequently gives rise to serious diseases."

* "Reports of the Royal College of Chemistry, and Researches conducted in its Laboratories, in the years 1845-6-7: London, 1849."

THE IRON TRADE.—On the only few occasions on which we have felt inclined to put the slightest trust in quarterly meetings, namely, on a recent show of onerous motive in the raising of wages along with prices, our partial confidence has very speedily proved to be misplaced. The present state of the trade is thus announced by the *Birmingham Gazette*,—one of the staunchest upholders of the masters' interests:—"The depression in every branch of this trade still continues, nor has the declared reduction of 20s. in price been followed by the slightest revival of demand. On the contrary, it seems to have had a prejudicial effect; and, combined with *the astounding disclosures that sales of manufactured iron had been previously made from* 20*s.* *to* 30*s.* *below the nominal rates*, and that good mine pigs were in the market under 3*l.* per ton, has done much to impair general confidence, and to prostrate any expectation of an early revival of business. The workmen, as was expected, have quietly acceded to the proposed reduction in their wages."

THE BUCKINGHAM ESTATES IN IRELAND.—A renewed attempt was lately made to sell these estates by auction. They are situated in Westmeath, and consist of 4,270 acres of land, with 121 labourers' and other houses, mills, &c., producing in all a rental of 2,300*l.* a-year. The whole was divided into four lots, for the first of which—653 acres of 'very excellent' land, with fourteen houses, rental in all 430*l.* a-year, —6,100*l.* had been previously offered and refused. The only offers now made were 4,500*l.* and 5,000*l.*, by one bidder—also refused. For the next two lots,—one of 1,279 acres 'of a very superior quality,' with 23 houses, and a corn-mill, rental 579*l.* a-year, upset price 7,000*l.*; and the other of 1,001 acres, 'average quality,' with thirty-nine houses, rental 526*l.*—upset price 4,000*l.*—there were no bidders. Lot No. 4 contained 1,338 acres, a moiety of 'the most superior quality,' with forty-five houses, and a 'well-paid rental' of 766*l.* 17s. a-year. For this lot 11,000*l.* were previously offered and refused. The previous bidder, Mr. Gibbings, now offered 9,000*l.* for this lot, but it also was bought in, as were all a second and third time without further offer. The sale was then adjourned *sine die*.

EXEMPTION OF LITERARY AND SCIENTIFIC SOCIETIES FROM LOCAL RATES, &C.—A meeting on this subject, consisting of delegates from a large number of these societies, was held at the City of London Literary and Scientific Institution, on Wednesday, the 6th instant; Mr. W. Brown, M.P., in the chair. The report of a committee appointed at a former meeting was read, setting forth the difficulties and injustice which attend the administration of the present Act; and stating, that a measure had been prepared, which, providing for the annual issue of a certificate of exemption, founded on an annual return, and simplifying the legal procedure in cases of litigation, would, it was believed, secure to these institutions the immunity intended to be conferred by the 6 and 7 Vict., c. 36. It appeared, that influential deputations had waited on Sir George Grey and Lord John Russell, and that the Government had promised to give immediate attention to the subject. The meeting was addressed by Lord Wriothesly, Mr. Wyld, M.P., Mr. Lacey, M.P., Mr. Birkbeck, Mr. Toulmin Smith, and other gentlemen; and it was determined to take active means to secure an efficient Bill.

DARTMOUTH PARK.—Lord Dartmouth, under the directions of his agents, Messrs. Pearce and Thynne, has laid out a large area of land at the Forest Hill station of the Croydon and Epsom Railway (close to Sydenham), as a park, with the view of inducing the erection of villas, and builders have already commenced operations. Several thousands of trees and evergreens have been planted, and a site has been appropriated for a church, much needed in the neighbourhood. The beauty of the locality, its reputed healthiness, and close proximity to London, are strong claims in favour of this new "settlement."

BRACKNELL CHURCH COMPETITION.—Fifty-one designs were sent in, from which three were at first chosen. Ultimately the committee decided upon one by Messrs. Coe and Goodwin.

COMPETITION.—Plans and specifications are wanted for the widening and improvement of Bristol bridge; premium 25*l.*, as advertised.

ARTIFICIAL MAHOGANY.—The following method of giving any species of wood of a close grain the appearance of mahogany in texture, density, and polish, is said to be practised in France with success. The surface is plained smooth, and the wood is then rubbed with a solution of nitrous acid; 1 oz. of dragon's blood is dissolved in nearly a pint of spirits of wine; this, and one-third of an ounce of carbonate of soda, are then to be mixed together, and filtered, and the liquid in this thin state is to be laid on with a soft brush. This process is to be repeated, and in a short interval afterwards the wood posseses the external appearance of mahogany. When the polish diminishes in brilliancy, it may be restored by the use of a little cold-drawn linseed oil.

INCISED INSCRIPTIONS.—Mr. J. Williams, an ingenious stone carver, of Ipswich, has submitted to us some specimens of a mode of inscribing stone which seems entitled to encouragement. The letters are incised and filled in with a composition (either black, or coloured for the capitals, as the case may be), and the whole face may then be either varnished or not. He has put up several Tables of Commandments in this way, and says he can execute them as cheaply as a competent painter could write them. The mode would seem to be applicable to other matters.

THE VALLEY AND CITY OF KASHMIR.—The view of the Valley of Kashmir, painted by Mr. Burford, and now exhibiting at his establishment in Leicester-square, is a very successful and interesting work, the merit of which, as of other paintings by Mr. Burford, is not sufficiently appreciated by the public although they visit them. The rapidity with which, assisted by Mr. Selous, he produces what are in reality well-finished oil paintings, full of nature, is quite marvellous.

THE OLD MARKET-HOUSE, BERKHEMPSTEAD.—A correspondent is anxious to draw attention to the old market-house at Berkhempstead, in order, if possible, to induce its repair, before it finally falls to the ground. It is one of those quaint timber erections of the Tudor age which are so picturesque, and which we do not desire to lose. A few well-timed repairs to the roof and posts which carry the building, and form a covered-way, may supersede the necessity of erecting a new one, and at present it accords well with the Grammar School.

LABOURERS' COTTAGES PRIZE ESSAY.—We understand that the Council of the Royal Agricultural Society of England have awarded the society's prize of 50*l.* "For the best Essay on the Construction of Labourers' Cottages" to Mr. Henry Goddard, architect, of Lincoln.

AN ARCHITECTURAL SOCIETY AT CHESTER has been formed, combining archæology and history. The Marquis of Westminster, lord lieutenant of Cheshire, the bishop of the diocese, and other influential persons have joined it.

TENDERS

For building Chapel and Schools in the Bethnal-green-road, for the Rev. J. Viney and others. Quantities furnished; Mr. Tarring, Architect.

Little and Son	£7,440
Ward	6,173
Holland	5,970
Curtis	5,953
Higgs and Son	5,896
Ashby	5,733
Wood	5,686
Grimsdell	5,612
Haynes and Co	5,537
Myers (accepted)	5,489

For House in Red Lion-street, Whitechapel, for Mrs. White; Mr. F. R. Beeston, Architect.

Wilkinson	£1,453
Rider	1,384
Saunders and Woolcott	1,348
Grimsdell	1,289
Wilson	1,275
Rivets	1,195
W. Hill	1,093

For Messrs. Charrington, for Clerk's Dwelling, Principal's Dwelling, Boundary Walls, Drains, &c.; Mr. A. R. Mason, Architect.

Trego	£3,545
Pritchett	3,471
Wilson	3,271
Jay	3,072
Ashby	3,002
Holland	2,990
Locke and Nesham	2,953
Lawrence	2,897
Piper	2,889
Grimsdell	2,829
Curtis	2,696
W. Hill (accepted)	2,598

[Sad work. Comments seem useless.]

MEETINGS OF SCIENTIFIC BODIES

Held during the ensuing week.

MONDAY, June 18th.—Institute of Architects, 8 P.M.
TUESDAY, 19.—Institution of Civil Engineers, 8 P.M.
THURSDAY, 21.—Royal Society, 8½ P.M.; Society of Antiquaries, 8 P.M.
FRIDAY, 22.—Archæological Association.

TO CORRESPONDENTS.

"*Contract for Tooting Parsonage.*"—"I beg to inform you that my tender was accepted, and I am now progressing with the works.—EDW. CARTER."

Received.—"G. H. W.," "Messrs. W. and B." (Berlin), "T. B.," "J. F. C.," "Mons. A. L." (shall hear from us), "E. C." (notice was in type), "W. H." (some of the best published examples of Elizabethan chimney-pieces are in previous volumes of THE BUILDER) "H. B.," Dublin (nitrate of lead is recommended), "J. B. R.," "T. H.," Lee's (it is against our practice to give praise on hearsay), "Pioneer," "J. J.," "Square" (look in any "arithmetic"), "W. A. L.," "An Architect," "M. P." "A Treatise on the Theory and Practice of Landscape Gardening, with a view to improvement of Country Residences." By A. J. Downing. (London, 1849. Longman). "Gas Lighting; its progress and prospects." By J. O. N. Rutter. (J. W. Parker, London, 1849). "Veritas," a poem. (Longman, 1849).

"*Books, Prices, and Addresses.*"—We have not time to point out books or find addresses.

ADVERTISEMENTS.

BRITISH MUTUAL LIFE OFFICE.—The Public are invited to examine for themselves the advantages gained for Assurers by the plan on which policies are granted by this Office.—Apply to CHARLES JAMES THICKE, Secretary, 17, New Bridge-street, Blackfriars.

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DESIGNS for FURNITURE, MANUFACTURES, SHOP FRONTS, EMBELLISHMENTS, &c., are prepared by and under the superintendence of Mr. DWYER.—Devisors' Offices, 17, Poland-street, London.

WRIGHT'S PLASTER OF PARIS.—Builders and Others are respectfully invited to make trial of this well-known plaster, as manufactured by the original maker and of improved quality. This firm has no connection with any other, and the only manufactory of Wright's Plaster is at the old established Works, 3, Upper Ground-street, Blackfriars.
N.B. Very superior Roman Cement.

FLEXIBLE INDIA-RUBBER PIPES AND TUBING, For Railway Companies, Breweres, Distillers, Fire Engines, Gas Companies, Gardening and Agricultural purposes, &c.—J. L. HANCOCK'S patent VULCANIZED INDIA-RUBBER HOSE-PIPES are made to stand hot liquor, and acids without injury—do not become hard or stiff in any temperature (but are always perfectly flexible) and as they require no application of oil or dressing, are particularly well adapted for Fire Engines, Pumps, Gas, Beer Engines, Gardens, Liquid Manure, and all purposes where a perfectly flexible pipe is required. Made all sizes, from ¼ inch bore upwards, and of any length to order. Vulcanized India rubber garden hose fitted with brass-taps, copper branch and roses complete, ready to be attached to pumps, water-butts, or cisterns. Sole manufacturer, JAMES LYNE HANCOCK, Goswell-mews, Goswell-road, London.
JAS. LYNE HANCOCK invites the attention of parties using long lengths of FLEXIBLE GARDEN HOSE to his SELF-ACTING HOSE-PIPE REEL, which will be found a most convenient machine for readily winding up and conveying away the hose when out of use. By it also liquid manure is easily distributed from tanks.
N.B. Vulcanized India-rubber washers of all sizes for joints or hot-water and steam pipes, and vulcanized sheet rubber any thickness for all kinds of joints, and other purposes.

DAMP and GASEOUS EXHALATIONS. SANITARY MEASURES.
MEMBERS of BOARDS of HEALTH are especially directed to the most EFFECTIVE MEANS which they can adopt to prevent the injurious and often FATAL EFFECTS upon the HEALTH of the COMMUNITY, arising from exhalations that are produced from moisture, decayed animal matter (as in graveyards), stagnant water, and collections of fœtid refuse, tending to produce a miasmatic state of atmosphere. In situations so affected, the impervious quality of the ASPHALTE of SEYSSEL renders it the most perfect PAVEMENT or COVERING that can be relied upon for hermetically closing, and thereby preventing, the rising of moisture and the escape of noxious vapours. The present extensive application of this material for covering roofs, terraces, and arches, for preventing the percolation of wet, is strong evidence of its effectiveness for the above purposes, which is further confirmed by the following extract from the Report of the COMMISSIONERS on the FINE ARTS. I. FARRELL, Secretary.
Seyssel Asphalte Company, Stangate, London.
"In 1839, I superintended the construction of a house of three stories on the Lac d'Enghien. The foundation of the building is constantly in water, about 19½ inches below the level of the ground floor. The entire horizontal surface of the external and internal walls was covered at the level of the internal ground floor with a layer of SEYSSEL ASPHALTE,* less than half an inch thick, over which coarse sand was spread. Since the above date, no trace of damp has shown itself round the walls of the lower story, which are for the most part painted in oil, of a grey stone colour. It is well known that the least moisture produces round spots, darker or lighter, on walls so painted. Yet the pavement of the floor, resting on the soil itself, is only about 2½ inches above the external surface of the soil, and only 19½ inches, at the utmost, above that of the sheet of water. The layer of Asphalte having been BROKEN AND REMOVED, for the purpose of inserting the sills of two doors, spots indicating the presence of damp have been since remarked at the base of the door-posts."
* This method has been adopted at the new Houses of Parliament.

ROYAL ARCH, DUNDEE.—A Design for this Building having been selected, the other Competition Plans are now ready to be returned to the gentlemen by whom they were sent in. Those wishing their designs forwarded by any particular conveyance, are requested to intimate accordingly, and to state their mottoes. The packages for London, Hull, or Leith, can be sent per traders, freight free, but at the risk of the competitors.—By order of the Committee,
Dundee, 12th June, 1849. THOMAS NEISH, Chairman.

CHEAP ORNAMENTAL GLASS.—I beg to inform my friends and the public, that I have now completed a new ENGINE, and, owing to the facility with which I can execute orders, I am enabled to reduce my former prices considerably. The prices are now from ONE SHILLING PER FOOT SUP., and borders from SIXPENCE PER FOOT RUN. A large quantity of the cheapest patterns always in stock. Embossing and painted work on the most moderate terms.—CHARLES LONG, No. 1, King-street, Baker-street, Portman-square.—Cash only.

E. and W. H. JACKSON beg to call the attention of Builders and the trade to the reduced prices of their PATENT PLATE GLASS, which, from its cheapness, is now superseding crown in all respectable dwelling-houses. BRITISH and ROUGH PLATE, CROWN, SHEET, STAINED, and ORNAMENTAL GLASS, supplied of the best manufacture, and at the lowest terms. List of prices, estimates, and every information can be had on application at their warehouse, 315, Oxford-street.

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PLATE GLASS.—THOS. MILLINGTON begs to inform the trade that he has now ready for Sale, a large quantity of BRITISH PLATE GLASS, which he can offer at the following low prices:—In sizes, under 1 foot super. 1s. 2d.; under 1 ft. 6 in., 1s. 6d.; under 2 ft., 1s. 9d.; and under 3 ft., at 2s. per ft. super. Also, Rough Plate, in various substances, from 1-8th in. upwards. Observe the address—87, BISHOPSGATE-STREET WITHOUT.

THE UNION PLATE GLASS COMPANY beg to call the attention of architects, surveyors, builders, large consumers, and the trade generally, to the quality, colour, and substance of their highly-finished glass, and as the discounts vary according to size, they prefer giving a special estimate for each quantity required. To encourage the use of Plate Glass for glazing purposes, the price is considerably reduced, which will, for its durability and appearance, insure the preference to any other description.
ROUGH PLATE GLASS supplied for skylights, warehouses, workshops, and flooring, 3-8ths, ½, ¾, and 1 inch thick.
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H. CHRISTIE, Agent.

REGISTERED
SOLID AXLE SASH PULLEY.—This pulley, after having been submitted to the most severe test is allowed to be superior to every other made for strength and durability. It is fixed with the same facility as the common axle pulley, and comes equally low in price. May be had from any of the Birmingham or Wolverhampton factors. The Crane Foundry Company, Wolverhampton, Proprietors and Sole Manufacturers.—No. 8 is all iron; No. 9, brass front and wheel with iron axle; No. 10, brass front and wheel with brass axle.

CHAS. WM. WATERLOW, MANUFACTURER

of Sashes and Frames, and Joiner to the Trade, 121, Bunhill-row, Finsbury-square.—Well-seasoned materials, superior workmanship, lowest prices.—Upwards of 400 DOORS, and a large variety of Sashes and Frames, always on sale. Glazed goods securely packed for the country. Steam-struck Mouldings in any quantity.—N.B. This Establishment is worth the notice of all engaged in building.

HURWOOD'S PATENT APPARATUS for MOVING and FASTENING WINDOWS, &c.
GENERAL DESCRIPTION.—This invention recommends itself in all its applications by its simplicity, efficiency, and certainty of action, and entirely dispenses with all pullies, weights, cords, springs, setopes, fastenings, &c. A principal feature in the invention is the application of the screw, or worm working into a wheel or rack, as a prime mover. The apparatus moves with ease and certainty; is very durable, not likely to be out of order; is perfectly secure in every position, and is applicable to conservatories, French casements, folding shutters, stables, ventilators, skylights, ship scuttles, deck and stern lights, and to all descriptions of windows, and is particularly adapted to public buildings, where security is an important object, as in lunatic asylums.
Further particulars may be had upon application to the Patentee, and also the terms upon which licenses are granted.
*** Illustrative Catalogues may also be obtained from the Patentee, Ipswich, by inclosing twelve stamps, to cover postage.

TODD'S PATENT PROTOXIDE PAINT, at a very considerable REDUCTION of PRICE.—This article is extensively used by the principal Railway and Gas Companies, and by Builders and others for painting Stucco. It prevents iron from rusting, wood from decay, masonry from damp, and the hottest sun has no effect upon it.—Manufactured by CHARLES FRANCIS and SONS, Cement Works, Nine Elms London.

PAINTING WITHOUT SMELL; a fact accomplished by the use of the newly-discovered SWEET OIL of TURPENTINE, instead of the deadly abomination called oil or spirits of turpentine. Paint mixed with it is free from smell, is improved in brilliancy of colour, and the baneful properties of the lead being neutralized, does not emit those noxious exhalations which have hitherto been so universally associated with painting. By this really valuable discovery house painting is now converted into a sanitary operation, that may be effected at any season of the year, being productive of health and comfort, without causing the slightest derangement to the domestic economy. Sold by the gallon, cwt., or ton, by every respectable oilman in the kingdom, and at the depot, 1, Bream's-buildings, Chancery-lane, where may be seen, and copies had of, the original certificate of Dr. Serny, a senior member of the College of Chemistry. Sold also in sample bottles, 1s. and 2s. each, bottles included.

THE PATENT ALKALI COMPANY'S METALLIC BLACK and PURPLE-BROWN PAINTS are applicable to every kind of iron and woodwork, farm, and other out-buildings, shipping, &c., &c., and are pre-eminently superior to all the ordinary descriptions of white or red lead, or *so-called* "Mineral Paints," in point of economy, durability, and preserving quality.

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JOHN A. WEST, Secretary.

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THE Advertiser, who is the Author of an important Invention in Shop Shutters, by which corrugated iron or wood laths may be made to supersede every other kind (possessing all the advantages of revolving shutters at one-third the cost), wishes to DISPOSE of his RIGHT in the INVENTION.—Apply, under cover, to L. W., care of Simpkin, Marshall, and Co.

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LONDON AGENCIES WANTED.—A Gentleman, by profession a Civil Engineer, resident in London, wishes to make an arrangement with either of the above, residing at a distant part of the country, in forwarding particulars of contracts, with accurate tracings of drawing and specifications relating thereto, soliciting orders, &c.; is also a good draughtsman, and would not object to occasionally assist in the office.—Address, G., care of Mr. Powell, Optician, 121, Gray's Inn-lane, Holborn.

S. POWELL (from ELLIOTT'S), Manufacturer of Engineers' and Surveyors' Instruments, REMOVED from 112 to 121, Gray's Inn-lane (one door from Holborn), where he hopes to meet with the liberal patronage he has hitherto received.

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CAST-IRON PIPES, IRON WORK FOR OVENS, &c.
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DRYING for BATHS and WASH-HOUSES, ASYLUMS, LAUNDRIES, &c.—The Patent Dessicating Company can dry, by their process, at any rate of speed, expel any amount of moisture; at the same time disinfect and give a sweetness to clothing, &c., altogether unattainable by means of cockles, steam, hot-water pipes, &c.—For full particulars, apply at the offices of the Patent Dessicating Company, 41, Gracechurch-street, City. ANGUS JENNINGS, Secretary.

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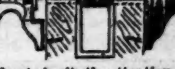
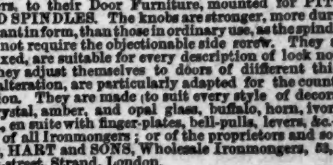
By Her Majesty's  Royal Letters Patent.
PITT'S PATENT SELF-ADJUSTING DOOR KNOBS AND LOOSE SPINDLES.

HART and SONS beg to invite the attention of architects, builders, and others, to their Door Furniture, mounted for PITT'S PATENTED SPINDLES. The knobs are stronger, more durable, and more elegant in form, than those in ordinary use, as the spindles, being loose, do not require the objectionable side screw. They are more readily fixed, are suitable for every description of lock now in use, and, as they adjust themselves to doors of different thicknesses, without alteration, are particularly adapted for the country or for exportation. They are made to suit every style of decoration, in China, crystal, amber, and opal glass, buffalo, horn, ivory, ebony, brass, &c., on suite with finger-plates, bell-pulls, levers, &c.—May be obtained of all Ironmongers; or of the proprietors and sole manufacturers, HART and SONS, Wholesale Ironmongers, 53, 54, and 55, Wych-street, Strand, London.
N.B. PITT'S PATENTED SPINDLE, being the only one that does not require a screw in the side of the knob or mounting, the use of any lock furniture without such side screws would be an infringement of the patent.

SAMUEL CUNDY, Mason and Builder, PIMLICO MARBLE and STONE WORKS, Belgrave Wharf, Pimlico, begs to inform ARCHITECTS and the PUBLIC that he has availed himself of improvements in his MACHINERY, by means of which he is enabled to produce GOTHIC WINDOWS MOULDINGS, PANNELS, &c. &c., at a very cheap rate, out of a superior stone from the west of England, as durable as any soft stone, and particularly sound.

S. C. has an economical method of dressing the above stone over, which produces, by the action of the atmosphere, a surface of crystalline hardness, and improves the colour.

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Vein Marble Chimney-pieces, of the best quality of material and workmanship, by improved machinery 40*s.*
Stone ditto, from..... 8*s.*

A variety on view in stock.

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CLERKS of WORKS have their particular attention called to the above establishment. Coats of Arms, Decorated Pannels, and other enriched works, promptly executed.

Every description of Stone or Granite work prepared, ready for fixing.—Delivered at the various Railways, and carefully packed in trucks.—Pimlico Marble and Stone Works, Belgrave Wharf, Pimlico.

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L. B. and Co., have a large and seasoned stock of the above at their general Depot, Caen Sufferance Wharf, Rotherhithe, near the Lavender Dock Pier; also at Messrs. BRINE, BROTHERS, Battle-bridge; No. 8, Paddington-basin; Vauxhall-bridge; and Kensington-basin.—Orders executed with dispatch to any part of the United Kingdom.—Offices, 18, Southwark-square, Borough; and Caen Wharf, 179, Rotherhithe-street, Rotherhithe.

NOTICE to PURCHASERS of CAEN STONE.

Translation of a CERTIFICATE from the Mayor of Allemagne, Department of Calvados, Normandy, relative to the propriety of the Caen Stone Quarries:—

"I, the Mayor of Allemagne, Department of Calvados, undersigned, do hereby certify to all who are interested in it, that it is an error and gross falsehood, as certain persons have reported, 'That the quarries of Allemagne belong to, and are leased from, the Government of France, and the local authorities of the Department of Calvados.' Neither the one or the other have any right or interest whatsoever in the said land or quarries.

"I hereby further certify, that the greater part of these quarries are worked by Messrs. Luard and Company, who are the principal proprietors, and Mons. Jobert, who is also a proprietor; the remainder are worked by smaller quarrymen of the neighbourhood, who sell their produce to certain dealers for exportation to England as it is required.

"Executed at Allemagne, this 29th May, 1849.

CALVADOS MAIRIE ALLEMAGNE

J. Buisson maire

Translation attested by F. HAYNES, Esq., C.E., &c., Symonds Inn, Chancery-lane.

N.B. The French manuscript may be seen at the offices of Messrs. LUARD, BEEDHAM and Co. Copies supplied of this upon application.

CAEN STONE, from the first Quarries of Allemagne. Depôt at the Whitby and Scotch Wharf, 14, Fore-street, Limehouse.—P. FOUCARD, quai des Abattoirs Caen (propriétaire des Carrières à Allemagne), begs leave to inform Builders, Architects, and others, that he has, on the above-mentioned wharf, the best stone ready to meet the demands of purchasers.—Contracts taken for any quantities.—Orders received by Mr. BASCHET, at 39, Stoney-street, Borough Market,—Cargoes shipped to order, from Caen, to any port.

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	½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	
	d.	d.	d.	d.	d.	d.	
Under 4 ft. long, or 3 ft. wide	3½	5	6	7	9	12	⅌ ft. sup.
Ditto 5 ft. do., or 3 ft. do.	4	5½	7	8	10	14	do.
Ditto 6 ft. do., or 3 ft. do.	4½	6½	8	9	10½	16	do.
Ditto 7 ft. do., or 3 ft. do.	5	7	9	10	11	18	do.

Larger Slabs in proportion.

	Thick.						
	½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	
	d.	d.	d.	d.	d.	d.	
Cutting to order	1	1	1½	1½	1½	2	⅌ ft. sup.

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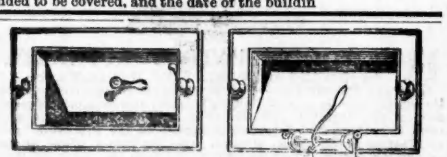

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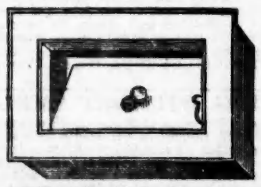

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